



University of Brighton

Summer 2017

# BRIGHTON

## FUTURES

Developing our futures through  
research and enterprise

esa  ZERO-G TEAM



# Contents

## RADICAL FUTURES

- Narrative capital** Policy-making in a post-truth world. p.07
- Micro-political acts of resistance** Education research in areas of coastal deprivation. p.10
- Transformational change** Strengthening the humanitarian innovation ecosystem. p.12
- Critical theory and radical politics** *Disorienting Democracy and The Politics of Transnational Peasant Struggle.* p.14

## CONNECTED FUTURES

- Animating the archive** Reenergising historical photographic exhibitions with new digital technology. p.19
- User-driven city** Accelerating digital innovation. p.22
- A friendly voice** Home telecare systems for the elderly. p.25
- Cyber terrorism** Securing our communications infrastructure against attack. p.26
- Smart specialisation** An economic boost for Brighton. p.28
- Backyard Brighton** A mobile app for accessing local history. p.31

## RESPONSIBLE FUTURES

- Niche tourism** Challenging the routes to a more sustainable future? p.35
- Going with the flow** Understanding the planet's river systems. p.37
- Responsive materials** Architectural solutions in earthquake environments. p.40
- An experiment in space** Thermal management in zero gravity. p.41
- Health4LGBTI** Reducing inequalities in LGBTI healthcare. p.44

## HEALTHY FUTURES

- Breast Cancer Pathways** to earlier diagnosis and better treatments. p.49
- Engineering Our Spine.** p.50
- A new approach to treating diabetes.** p.52
- Mosquito** How understanding mosquito buzzing might alleviate the spread of disease. p.53
- The experience of play** Examining the play of 6-12 year olds with Cerebral Palsy. p.54
- Bacteriophage** Developing effective ways to control infections. p.55

## CREATIVE FUTURES

- Tell me a story** Brighton's digital storytelling work helps those in the criminal justice system. p.59
- Touching the world lightly** Drawing as research. p.60
- The world of creative exchange** Connective journeys through arts practice. p.62
- The potential of touch** Textile design and the prevention and treatment of scabies. p.64
- Assistive technologies for stroke sufferers.** p.66
- The picture of health** Drawing in the clinical consultation. p.67
- Join the dance** Dance and sport for health, happiness and well-being. p.68

# Foreword

The University of Brighton is harnessing the practical wisdom from across its many disciplines, bringing to a local, national and international platform not only new knowledge, but the means to put that knowledge to practical use. The understanding we develop at Brighton offers promising futures to people around the world.

In this publication, *Brighton Futures*, we consider how we can build better futures in ways that are radical, connected, healthy, responsible and creative. Noam Chomsky said that “unless you believe that the future can be better, you are unlikely to step up and take responsibility for making it so.” That belief is inherent in the work that we do at Brighton and in our commitment to research and enterprise that improves futures.

Diverse practices contribute to the research and enterprise activities undertaken by members of our community at all career stages, examples of which can be found in these pages.

Our Radical Futures consider, among other things, how narrative studies and critical theory make changes at the roots of political thinking. In Responsible Futures, we highlight the university’s work to better understand the planet’s water, how we advocate for fair treatment in health care, and get a rare glimpse into zero gravity testing. In Connected Futures, we examine the roles of digital advances, photographic archiving and human interactivity. Healthy Futures features investigations that put patients and communities at the heart of our research and enterprise, while our Creative Futures consider creativity for well-being, digital storytelling and the physical process of drawing.

We hope you enjoy this small selection of the research and enterprise work that continues to develop at the University of Brighton.

Professor Tara Dean  
Pro-Vice-Chancellor (Research and Enterprise)

The University of Brighton has made a unique commitment to supporting research which radically challenges the perverse inequalities which structure our global lives.

Dr Mark Devenney  
Academic Lead: Radical Futures

## Introduction to Radical Futures

What is radical? How is society conditioned to understand its future in response to radical possibility? The word comes to us from the Latin *radix*, root, and the sense lingers that radicalism is about a relationship with root causes and root beliefs.

The more familiar uses of the word, in a political sense, came about two hundred years ago, with the notion of radical reform. It is perhaps a short step then to the contemporary ideas of radical that developed in the twentieth century, suggesting “unconventional”, or the notion from the urban dictionary that radical implies “at the limits of control or understanding.”

Radicality is literally a process of uprooting, a metaphor familiar to researchers. The research that is brought together under the theme of Radical Futures asks questions that are deep in the roots of human experience, taking apart those things which might be overlooked or trodden under, taking them apart to examine, reformulate and reinvigorate. Our researchers work in rich earth and upon deep roots, bringing understanding of the full history of philosophical thought to the most contemporary of problems.

The radical can be applied to research in any area. It is about systemic rigorousness, a penetration to the roots of the problems that we most need to tackle. It is also about its opposite: in a shift patterned on the etymological journey of the word, it is about rootlessness, about breaking away from what threatens to keep us fixed and unprogressive. It is the extremes of activity and the possibilities of unbounded exploration.

Through rigorous intervention in the public arena our researchers embrace the possibilities of a Radical Future, moving beyond its academic boundaries and committing to making real change, root change, through research and enterprise. It is not enough to examine and to comment upon the world. A truly radical intervention discovers what changes can be made and is an active agent in that change. In this way we translate new thinking into activity that moulds the new communities, working relationships and inspirational ventures of the modern age.



# Narrative capital

## Policy-making in a post-truth world

**The publication of *The Routledge International Handbook on Narrative and Life History*, edited by Professor Ivor Goodson has proved extremely timely. Published in January 2017, it coincided with the inauguration of Donald Trump as President of the United States – a perfect example of a triumph fuelled by one of Goodson’s key theories, that of ‘Narrative Capital’.**

The concept of narrative capital complements social and cultural capital and increasingly outweighs them. In politics its deployment is a major factor in political action and one that Goodson sees Trump using to his advantage. Trump’s cultural and symbolic capital may be viewed as poor in that he doesn’t have the family and educational background that confer political clout with the experience of the majority

of Americans; instead, he has framed his political narrative around being an ‘establishment outsider’ and therefore speaking for ‘ordinary people’.

Trump fascinates Goodson, particularly as he is currently writing about the relationship between narrative capital and leadership. Behind his brash and often politically naïve façade, Goodson suspects Trump is a very sophisticated manipulator of people’s narratives and lies at the high-end of narrative capital which, of course, is worrying: this space has, in the past, also been occupied by Facist demagogues who were good at crafting narratives which resonated with large numbers of people very quickly.

David Cameron’s political career illustrates the impact of this swing away from cultural and symbolic capital. Cameron had top-notch cultural and symbolic capital by virtue of his education at Eton College and the University of



Hillary Clinton supporters. Credit Gage Skidmore



Pride in London 2016 - Anti-Brexit and Love Wins signs. Credit Katy Blackwood

Oxford, which would once have provided an authoritative base for political leadership and persuasion. In the age of narrative politics this no longer holds sway and, in some ways, worked against him. Goodson believes that his narrative capital was poor: his stories, like 'The Big Society' or 'We are all in this together' were profoundly emotionally illiterate and, tellingly, his political opponent in the referendum, Nigel Farage, used strong narrative capital, tapping into the idea that he represented 'ordinary people' who wanted to wrest back control of the UK from the EU.

"There is no doubt that we now live in a post-truth world," says Goodson, "and that digitalisation in the use of online news distribution is going to exacerbate the situation leading to easily manipulable realities. We have seen this with Brexit and Trumpism – this is post-truth narrative behaviour by people with really high narrative capital. They knew which 'buttons to press'; the same buttons now being pressed all across Europe and America, the message being: 'We need to take back control and we need discipline.' Trump is in a financial but not social elite, yet has tapped into vernacular truth which is powerfully evident in much of disenfranchised America."

The notion that we are living in a society which is 'beyond truth' is profoundly related to these theories. The central issue is that it is possible to craft a narrative to suit your needs from any news story, irrespective of facts. Goodson quotes a high-level policy advisor to the US government to illustrate his point with reference to charter schools, "I am not saying we have to change the policy at all, I'm saying what we have to do is change the story about the policy." Goodson's theory of Life History, which insists that you give 'a story of action within a theory of context', means that the narrative cannot free-float but has to be

contextually grounded, providing an important counter to existing narrative stories and one that demands engagement with factual evidence.

These theories are the product of a research project, 'Learning Lives', which was commissioned as part of the university's Teaching and Learning Programme 2000 – 2011, and which engaged 700 researchers in some 70 major projects. This was a four-year longitudinal study of people's lives and life history narration with a particular focus on learning episodes. In particular Goodson was concerned to define and delineate what he called 'narrative learning'. The challenge was to discover: 'What is the significance of the life story we tell?' Goodson and his team interviewed 160 people, from Members of Parliament and pop stars to asylum seekers and homeless people in Brighton. Perhaps one of the most innovative theories that came out of this work was the notion that in this age of storytelling and narrative politics there are clusters of different forms of narrativity. Illustrating this, Goodson relates the story of an interview with Arthur Miller, who at 86 was interviewed about his life history at University of East Anglia:

There was a crucial moment when the interviewer asked him, 'What's it like to be 86?' to which his response was, 'Well, it's easy to answer that, you sit in front of the TV all day, you eat TV dinners, the next day you get up and do the same thing.' 'And what about you?' asks the interviewer. 'Oh, I get up at 6 O' clock every morning, I write for six hours, have lunch with my 32-year-old wife, and then after lunch I write again and I do that seven days a week.'

'So what's the difference between you and all of the people with the normal script of being 86?' Then there's a long pause and he says, 'I guess I'm the sort of the person who's in the process of becoming and always will be.'

From that interview Goodson started to develop the notion that people fall into a number of clusters, one of which is *scripted describers* i.e. they recite their life as if it has happened to them, passively. They embrace the script early on – they are going to be a farmer or a housewife and they live with that script but they don't essentially alter it. On the other side there are people who he refers to as focussed elaborators who elaborate a notion of who they will be and then become it – Arthur Miller for example.

"The question of where Trump lies is profoundly interesting," Goodson says. "Both Jeremy Corbyn and Teresa May lie at the dead-end of descriptive describers. Where are the focussed elaborators in British politics? I can't think of any at the moment. In America there are several, and I think Trump is one, but he is complicated."

Goodson plans to follow up this research with two lines of enquiry – firstly the importance to policy-makers of the notion of refraction. Refraction is a concept which explores the mediations and negotiations which emerge when 'world movements' or global initiatives are embedded in national and local systems and structures. In the study of seven national European systems carried out in the book *Professional Knowledge and Educational Restructuring in Europe* (Goodson and Lindblad, Eds, 2010) he examined the different national and regional responses to global movements of change and educational restructuring. The ranges of refraction show how patterns of reinterpretation and re-contextualisation can substantially influence and potentially re-direct world movements and global initiatives which seek to reconstruct our systems and services.

Goodson continues to edit the *Journal of Education Policy*, which he founded thirty years ago, and which is in part an attempt to use these rather esoteric ideas in the policy domain. He has recently expounded the practical consequences of his narrative theories in his blog commissioned by the British Education Research Association on Policy Making and Evidence entitled

'Heading for Divorce' in which he argued that policy-making in England, particularly in education in Britain, is now entirely divorced from an evidence base: "The post-truth question drills down very well into the policy debate. For example, the proposed introduction of grammar schools by Theresa May fitted her own life narrative and that of her inner group, but it was without context: she didn't have an understanding of why grammar schools worked in the past but cannot be introduced now and be expected to produce the same kinds of results. Experts in the wider education policy framework were totally opposed to it. That's why that distinction between narratives and life histories, which demand that you interrogate the narrative contextually, is more important than just a theoretical debate. It feeds back into these policy frames."

Goodson, nominated for inclusion in the 2000 Outstanding Intellectuals of the 21st Century in 2016, compares current educational policy-making to that of the 1970s, when he feels there was a clear relationship between the evidence generated by educational researchers and the policies that followed. There was often a long period of germination before policies were announced, curricula were planned and piloted for years before they were introduced. Policy are now announced on the wing, and evidence appears irrelevant: "Policy is based on a free-floating narrative that grammar schools equal social mobility and if you look at the evidence it is largely counter to that. So this represents a post-truth policy."

He feels there has been a move away from an 'enlightenment world' of planned purposefulness, rational discussion and evidence leading to policy, to a world of just skimming the surface and coming up with quick sound-bite policies based on no evidence but which capture a popular mood or narrative. He regards this as "a profound shift and a very worrying one."

As the references to 'post truth', 'alternative news' and 'alternative facts' proliferate, they underline the urgent need to understand this growing acceptance of an alternative to a factual, contextualised understanding of any situation, closer to a more traditional concept: the truth.

# Micro-political acts of resistance

## Education research in areas of coastal deprivation

What should happen when standards imposed by Ofsted are not a good fit with local needs and are potentially detrimental to pupils whose education they are intended to protect and improve?

Aly Colman is conducting research into the ways that policy enactment may change in the light of intense scrutiny from the schools' inspectorate. It explores the mismatch between the imperative to score well in league tables and the very real needs of local children in areas which suffer from coastal deprivation and which do not fit Ofsted's model.

One of the schools participating in Colman's research has chosen a very defined employability strategy. Pupils are only required to take two A levels alongside an intense period of work experience with the aim of developing a strong relationship with local businesses and employers. At the same time, some of their pupils are being sponsored by local businesses to go on to university, which clearly has value for the local community. This school is being assessed against Ofsted's standard expectation of sixth form pupils being entered for at least three 'A' level subjects, which means it will not score as highly on this aspect of assessment

as other schools. However, the school believes that the provision of imaginative, stimulating and sensitively contextualised practices in teaching justifies their innovative approach and that this is of more value to the community. They work with the hope that the regulator will take a more balanced view in relation to local needs, but the data emerging from league tables and school rankings demonstrates that this type of innovative approach can prove a risky strategy for schools which take a different path.

Colman's research focuses on the East Coast of England but her findings have implications for other areas of the UK. One of her findings is that many other school leaders feel that, while they are under the gaze of Ofsted, they need to follow policy to the letter and adopt methods that have been deemed good practice. This is in spite of the fact that there may be a perceived tension for school leaders and teachers about what is best for their own communities.

Colman is conducting a case study of a coastal town on the indices of deprivation through a series of interviews with leaders in a secondary school and primary school, and is interested in teachers and leaders who recognise this tension. In particular, she is looking at those



who decide to go against what they feel they should be 'seen to be doing' and allow a more sensitive approach to context guide them, those who recognise that by taking such an approach they are in effect undertaking micro-political acts of resistance.

Her research highlights the fact that schools that serve more affluent communities with parents with rich social, cultural and linguistic capital are often deemed good or outstanding because they are empowered to take greater risks and be creative and innovative in their teaching. At the moment the schools that most need to serve their community with innovative, engaging and imaginative teaching are the least likely to be able to be innovative.

"I think there is a bigger more powerful story about impact which is that the Ofsted regime is coming at a cost" says Colman, "that of imaginative, vibrant, colourful teaching, meaningful to children who most need to feel that schooling is something exciting, valuable, powerful and useful. That capacity to work within the context first, to have that vision, can only really come from some sense of security ... those schools whose hands are tied because of the relentless gaze of multiple inspections can't

take the required risks and be innovative, allowing creative teaching to happen. That's potentially very damaging and needs to be addressed."

Most of the teachers Colman is interviewing say they can't take risks, yet in coastal areas of severe deprivation with very low levels of literacy among parents and very high levels of intergenerational unemployment, there is an imperative for teaching to counteract these factors and the impact they have on the pupils' notions of the importance of their own education.

Colman hopes that her research will encourage other school leaders to make conscious decisions to take a context focussed approach and to recognise the positive benefits for their schools and communities.

# Transformational change

## Strengthening the humanitarian innovation ecosystem

The international humanitarian community is facing unprecedented challenges that are growing in scale, scope and complexity. In 2015 alone, nearly 125 million people were affected by a combination of natural disasters, wars and conflict. The number of people needing assistance as a result of such challenges has more than doubled over the past decade.

International humanitarian agencies are already struggling to meet these rapidly-growing and increasingly-complex needs. Without concerted effort, the gap between what is needed and what is provided is likely to widen in the coming years and decades. There is an increasing awareness of the need for transformational change in what humanitarian actors do and how they do it to maintain relevance, reputation and impact.

Innovation is one of the key components underlying transformational change. Wherever it happens, innovation is about creating value through the application of new ideas. But it seldom happens purely by chance. Fortunately, today many humanitarian agencies have begun to embrace ideas and principles of innovation as a means of addressing the future challenges facing the sector. They have been assisted by a programme of research led by Professor Howard Rush at the Centre of Research in Innovation Management (CENTRIM), sponsored by DFID, the UK's Department for International Development, research which made a major academic contribution to the UN's World Humanitarian Summit (WHS).

Of course there is already a long history of innovative responses in the sector. Finding creative solutions to challenges of providing food, shelter, medical care and other forms of assistance, often under extreme conditions, has always characterised the humanitarian sector. However, such activities largely took place in reactive mode and have typically been incremental in nature; the focus was on the innovations themselves rather than looking for an underlying process which could be mobilised to generate a steady stream of solutions, enable learning between projects, and the building of the skills and capabilities required for developing and diffusing 'game changing' innovation.

The barriers to achieving more radical or disruptive innovations is, to a large extent, because humanitarian innovation takes place within a context in which there is a high degree of risk aversion. This is a consequence of the strong concern to spend public-donated money wisely and to ensure rigorous evaluation and evidence-based policy making to maintain high ethical standards. It is exacerbated by the relatively concentrated nature of the funding supply side which approximates to an oligopoly of

agencies. Where innovation takes place it tends to do so along clear and well-established trajectories, reinforcing and working within a 'dominant design' framework with an emphasis on incremental 'do what we do but better' innovation. Only a handful of more radical innovations exist within the sector, and such 'do different' forms of innovation are the result of a few 'mavericks' operating within the field who, through force of personality and perseverance, have managed to introduce more 'disruptive' (but positive) innovations.

The sector can also be characterised as somewhat insular and self-referential. In an era with emphasis on 'open' innovation and with growing experience in developing mechanisms to enable much wider networking and resource sharing around innovation, the humanitarian world still operates in a largely 'closed' mode. There is a degree of concern about the practicality and underlying ideological issues associated with working with external partners, particularly from the private sector; again the strong values underpinning the sector may be acting to constrain innovation and to limit the potential for resource sharing and capabilities building.

The overarching aim of the research conducted at CENTRIM has been to analyse and assess the system of actors and factors that shape innovation within the humanitarian sector. By developing an 'innovation ecosystems framework' and associated analytical approaches derived from the field of innovation management, Rush and his team sought to move toward a thorough understanding of the challenges facing humanitarian innovation, and how they might be overcome. Recommendations from the CENTRIM research team were endorsed by the WHS and have led to the establishment of the GAHI, a Global Alliance on Humanitarian Innovation.

Rush is keen to translate their work on humanitarian innovation in a way that engages more directly with practitioners. To this end, he and his colleagues have been adapting their popular Managing Innovation course, which has previously been widely attended by over 9,000 private sector managers from 17 countries, to something that meets the needs of not-for-profit organisations and, in particular humanitarian agencies and organisations.



## Critical theory and radical politics

A key part of the Radical Futures agenda for the university is the decade-long work completed by scholars of critical theory and radical politics. Two early career researchers, Dr Clare Woodford and Dr Robin Dunford, have newly released books which consider radical politics in different contexts. For both, theories of democracy and emancipation must engage with the everyday struggles against precarity, poverty and political exclusion.

### *Disorienting Democracy*, Dr Clare Woodford

Clare Woodford's book *Disorienting Democracy* rethinks democracy as a practice which counters the poverty, inequality and insecurity that mark our contemporary era. The left, she argues, must urgently return to strongly redistributive policies. Unfortunately many leftist organisations replicate the very inequalities they claim to challenge. Woodford untangles emancipatory ideals from their implication in forms of domination which undermine their potential. She defends a simple idea, an idea too often ignored by supposedly radical activists: everyone is equally capable. A radical politics of emancipation is enacted by subjects who refuse the assumption that they are incapable of acting. In appropriating alternative ways of living they break with the established consensus, they subvert our unequal world and they take equality for themselves, rather than demanding it. Challenging what it means to do political philosophy, Woodford rejects the longstanding divide between theory and activism and celebrates dissensual practices which move beyond critique to establish democracy in an equal world today.

For Woodford politics is not the art of governing. Rather democratic politics disrupts an ordered society in the name of the equality of anybody. Democracy is enacted by the poor who appropriate equality against a social order which tries to keep them in their proper place. These practices are not new. They are already used by political movements and activist groups. Woodford focuses on how to subvert consensus: how to move towards worlds where measures of democracy are not reduced to turnout statistics. Democracy upsets a world which treats the people as stupid, apathetic, ignorant and immoral in need of ever more repressive regimes of security. She rejects the politics of the war on terror which produces drone strikes, suicide bombing and torture; and she challenges the poverty and inequality which divide residents of states, cities, and streets defending strategies of equality against our 'cheerful consensus' and its 'denial of humanity' to so many. Her book restores 'politics' by reinvigorating the promise and possibility of emancipation.



### *The Politics of Transnational Peasant Struggle*, Dr Robin Dunford

Peasant communities across the globe are challenging the dispossession caused by a global food system which treats food as a commodity traded for profit. Peasants have occupied land to produce their own food in an environmentally friendly manner; have shared seeds and knowledge across national borders, and have campaigned for a United Nations declaration on the rights of peasants. In so doing, peasant activists are seeking to radically change the way we think about food and the environment. They demonstrate that small-scale producers and gatherers can feed the world, restore the health of soils, and cool our planet.

*The Politics of Transnational Peasant Struggle* analyses these practices of peasant resistance. It demonstrates their significance for thinking about resistance, human rights and the building of a democratic and sustainable food system. It calls for radical scholars to attend to the voices and agency of grassroots activists, and it recalibrates theoretical debates about radical politics in light of evidence on the ground. The book shows that human rights can be

collective, non-market led, and emancipatory. Human rights do not simply travel from the 'west' to the 'rest' through the work of elite actors. In fact grassroots activists in the global south appropriate, recreate and raise awareness of human rights for radical ends.

Understanding the creation of new rights by the peasant movement also challenges the darker sides of human rights. The book explores how demands for peasants' rights have been translated in elite-level UN consultations. This translation often compromises their radical potential. The key message of this research is simple: the peasantry can feed the world, cool the planet, and help create a socially and ecologically just world. However, for them to do so global governance must embrace the radical new vision provided by peasant activists, and challenge the commodification of our food.





---

*Digital connectivity has accelerated a post-enlightenment age requiring holistic, human-centred and design-led problem solving that draws on the canon of all research traditions. Connected Futures aims to support the application of creative expression, theoretical analysis, scientific rigour and technological innovation to progress some of the complex issues of our time.*

---

Prof Karen Cham  
Academic Lead: Connected Futures

## Introduction to Connected Futures

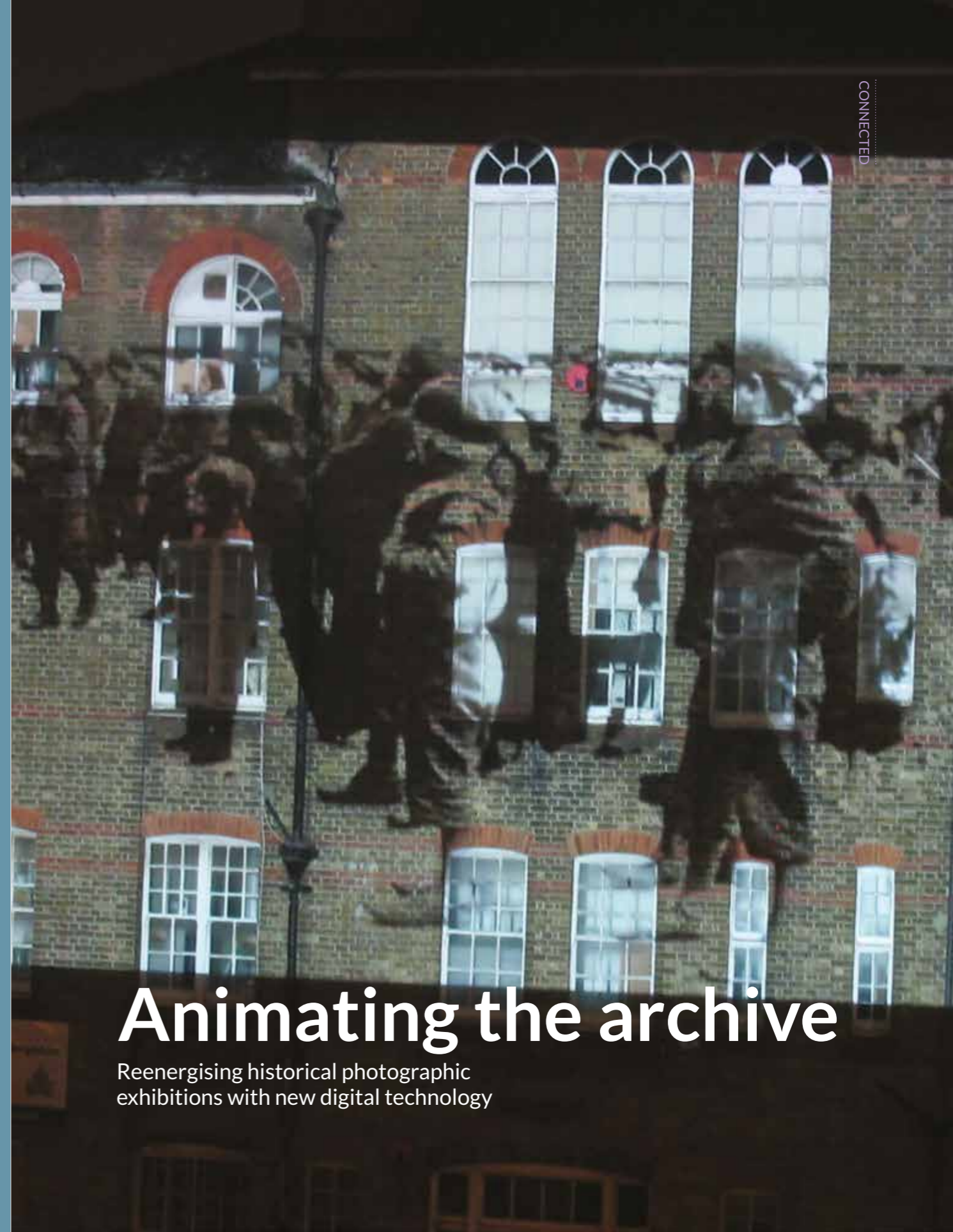
By framing one thematic strand of the university's cross-disciplinary research as Connected Futures, we recognise that advancement through research and enterprise is a process of enhanced connectivity. We also recognise the increasingly self-evident role played by the tools of connectivity in the progress of society and the increased consciousness that society has in how connections are made, developed and understood.

Connected Futures research can enlighten us as to the rapid contemporary changes in the interactions between people, material objects and digital media worlds. It has a vital role at the most productive interface between the arts, humanities, social and computing sciences, with a reach that takes in digital imaging techniques, artificial intelligence, computational modelling and security engineering to enhance and protect the information infrastructures that underpin our economy and society.

Digital connectivity in particular has accelerated a post-enlightenment age which requires holistic, human-centred and design-led problem solving that draws on the canon of all research and enterprise traditions. Focusing on providing connected solutions to the complex problems of our time, the Connected Futures address communications, management, logistics and production as ecosystems in the post-industrialised world. Additionally, a greater degree of connectivity between university teaching, research and enterprise will ensure a sustainable synergy in the generation of new knowledge between research-driven enterprise to demonstrate impact and the currency of our teaching excellence.

Research and enterprise examines how to design and manage for those unpredictable outcomes from systems that are reaching astonishing levels of complexity; it considers the ethics of data collection and the fact that every digital act is a recorded act.

As we make our discoveries at the edges of contemporary experience, we also consider how we are connected to our concepts of the past, our records and identities, using innovative methods that build trust so that new understandings of the relationships between individuals, communities, businesses and non-profit organisations will ensure people benefit from our research and innovation.



# Animating the archive

Reenergising historical photographic exhibitions with new digital technology



**How can archival material be presented in a way which engages public audiences? Can exhibitions respond to the challenges of an audience familiar with tracking images and histories across the internet? What is the significance of these exhibitions to the public whose own family histories were part of the landscape portrayed? An exhibition of photographs taken by public health and urban planning departments in Canada and the UK to document housing conditions of the slum communities in the 1930s century tackles these questions.**

The images of children inadvertently captured by these photographs is the central theme of the exhibition *From Streets to Playgrounds*, co-curated by University of Brighton photographer and researcher, Julia Winckler and colleagues from the University of Toronto and Ryerson University at the City of Toronto Archives Gallery. The research and production of the exhibition has been supported by a three-year insight grant from SSHRC (Social Sciences and Humanities Research Council Canada), 'The wished for city.'

The exhibition asks what new insights can be gained as photographs resurface through time and are reanimated through new interrogative methods and sensibilities. The interdisciplinary research team working with the images included artists and scholars from within the fields of social sciences, visual studies and fine art, whose collaborative research has developed innovative ways of working with archival photographs to open up new narratives and readings. Through a multiplicity of displays, which include long panoramic views, historical timelines, videos and modern digital display technologies, the team have created innovative ways of working with archival photographs and made it possible for visitors to interact with the material.

Using specialist software that takes a static photograph and brings it to life with subtle movement using the 2.5 D Parallax slow motion panning effect, two images of Toronto in 1912-13 have been transformed: viewers are given the impression of being immersed inside the enlarged pictures. For example a photograph of the official opening of Toronto's first children's playground in 1913 is given a new sense of presence; with this innovative technique it is possible to focus in and explore all the original streets, alleyways and playgrounds that would otherwise blur into the background. It also allows viewers to engage with the individual children and their gestures, pictured within the frame of the photograph.

In 2015, the team hosted an exhibition of a selection of these photographs, including photographs taken in the Carlton Hill area, at Brighton's Jubilee Library. Life-size photographs were displayed in the library windows and could be viewed from inside and outside, inviting encounters with the public. In looking at them, the viewer catches sight of previous lives; the city and its spaces once belonged to others. The Brighton photographs were also reanimated during two site-specific projection events in which photographs were cast onto the external brick walls of the Circus Street School, the last original Victorian building in the area still standing, and itself scheduled for demolition to make way for large-scale redevelopment. These were accompanied by interwoven reminiscences by former residents.

By situating the archivally-derived materials in public spaces, the team has engaged contemporary audiences with the intention of eliciting intergenerational exchanges of collective memory. The recent reappearance of socially-engaged photography documenting the urban poor and slum clearance in exhibitions and publications in Britain, Canada and France are all part of wider social, cultural and political movements seeking to reframe the way we think about the past. The Carlton Hill collection continues to live on; the photographs, in their manifestations as physical objects or online images, continue their 'itinerant journeys' and retain their ability to communicate across time. New reworkings become possible, along with new sets of questions. Visual methods facilitate and heighten interventions, they dislodge familiar readings, and reopen those relations anew.

## Academic partners are key for our museums and galleries

Kevin Bacon, Digital Manager of Royal Pavilion Museums (RPM), believes that, through allowing wider access for academics and community organisations to museum and gallery collections, they have an important role in broadening their relevance and public appeal.

Bacon manages the RPM's online content. It is a huge job with over 60,000 published records, including almost 20,000 digitised items. While growing, these only represent a fraction of the collection: Essentially it is a Victorian museum service with a very wide collecting policy including anything from fashion to local history to film and media to anthropology. The exact number of items in the collection is unknown but is well over one million.

In his previous role as the museum's Curator of Photographs (2007–2011) Bacon was responsible for overseeing a collection of over 150,000 images, which are now held at The Keep. During that time he staged an exhibition in the Prints & Drawings Gallery of Brighton Museum called 'Lives Less Photographed', which was a display featuring working class life in Brighton from 1860 to the 1920s. Through this project he began working with Julia Winckler on the Carlton Hill project. The exhibition

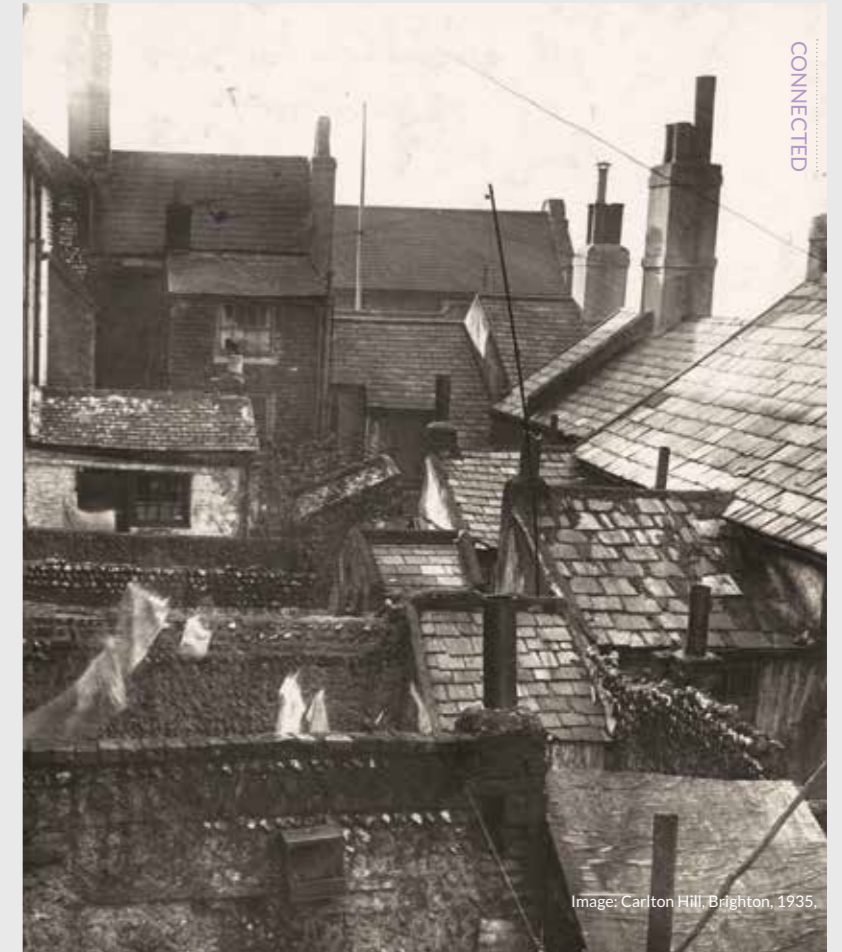


Image: Carlton Hill, Brighton, 1935.

displayed views of Brighton that would not usually have appeared in a public exhibition, including substantial numbers of photographs of proposed slum clearances in the Carlton Hill areas around 1936. Most of these were shabby near-derelict Victorian structures and consequently this is the first time they had ever really been photographed: "Before the slum clearance surveyors, nobody had ever bothered to record these areas. Julia's research in the Carlton Hill area benefitted from the use of resources at the Brighton Museum, which fed into her research looking at this particular type of, often overlooked, vernacular photography."

As well as its role in displaying the collection, the museum regards itself as a repository with an important role in enabling other people to tell

the stories about the collections whether they are community groups or academics. "The great thing about Julia's work was that it was actually taking some of those images outside the academy," says Bacon. "Using them in projections in the area they were taken was a really lovely idea and from the perspective of a museum, it is great to see our collections being used by other people. We often don't have the resources to pursue these ideas (or the idea for different uses themselves) so if we can enable and support people to tell their stories that's a really good thing in terms of demonstrating our public benefit."

For further information: [brightonmuseums.org.uk/collections](http://brightonmuseums.org.uk/collections)



# User-driven city

## Accelerating digital innovation

As part of a government strategy to put the UK at the global forefront of digital communications, the University of Brighton is supporting a testbed project for 5G technology through the Digital Catapult Centre Brighton. The aim is to build on Brighton's reputation as a creative digital hub to accelerate the innovation of 5G products and services and position the city as a centre of expertise. The innovations will anticipate what kinds of products and services 5G might offer; for example, a mobile personal cloud on your phone or location-based augmented reality.

However, as the 5G signal is not simply faster 4G, the project is engaging highly innovative companies to explore the communicative potential of the signal and working in partnership with the 5G Innovation Centre at the University of Surrey to define how the testbed itself should evolve.

The Digital Catapult Centre Brighton was established in 2014 with the aim of accelerating the practical application of university research to the digital sector. Karen Cham, Professor of Digital Transformation Design, is academic

lead of the centre and responsible for strategic development of research themes and academic partnerships. The Brighton centre, one of three nationally, focuses specifically on projects that encourage releasing value from real-time and location-based data – known as the Internet of Place, a human-centred take on Internet Of Things (the interconnection via the Internet of computing devices embedded in everyday objects, enabling them to send and receive data). One local business for example, can provide unique digital identifiers for physical objects, which is important for any coherent Internet of Things service.

"The catapult centres are research-led so it's an opportunity for university researchers to demonstrate increased impact through partnerships with local businesses," says Cham. She is currently putting together a bid for Innovate UK, the government innovation agency, for their Smart Infrastructure call, which will bring together a number of different academics from across the university, from people with expertise in technology to placemaking, healthcare and design. Partnering with a number of small to

medium enterprises (SMEs) from the Catapult, which have highly innovative products and services, such as a realtime data-driven care planning tool, this presents the opportunity for accelerated research impact in a real setting. "We often find that smaller commercial innovators have solved really complex problems; large organisations are sometimes trying to crack a problem that has already been solved: it's about bringing all stakeholders together to share knowledge and expertise."

The aim of the bid is to enable end-user behaviour to drive service provision, particularly through the local authority. Bristol positioned themselves as a playable city and Brighton is positioning itself as a user-driven city: "It is about democratisation of service demand," Cham says. In fact, the planned campus developments at Moulsecoomb will include a satellite Digital Catapult Lab allowing high-growth SMEs to access university research expertise on site.

The Lab will be focused on 'Data: Privacy, Ethics & Nudge' as that pulls together the general, commercial and research concerns around all forms of data. It also allows the university to draw upon resources and expertise from across all the schools to offer a unique interdisciplinary nexus of expertise that can support local SMEs in research and development and again accelerate the impact of academic research.

Cham's own research is closely related to this fusion of digital and creative thinking, focusing on how to create change in complex human-centred systems: cities, economies and hospitals for example. "My expertise is in how to design digital technology to nudge desired behavioural outcomes on a large scale. My research has always been about closing the semantic gap between users' expectations and machines, towards ensuring emotional engagement, because without that you are unlikely to get any take-up. For example, if you go into a large organisation to create culture

change you have to look not only at the existing technical systems that need to be migrated but at the socio-cultural aspects of performance that are important to people in that organisation too."

An interesting challenge which demonstrates the power of this model was a project with a government which looked at how to set up an emergency digital economy that could be instigated within the first fifteen minutes of a major disaster. In this context, financial exchanges are made in cash, and so one of the design solutions was to integrate the appearance of cash, thereby providing a sense of comfort and continuity through symbolic capital. Cham was able to demonstrate quantifiably, by using biometric evaluation methodologies such as eye tracking, EEG and facial recognition in the development cycle, that much more traction would be obtained from a virtual economy if it mirrored traditions. "I'm fascinated by how non-tangible things such as brands, rituals, symbols, totems and icons create real behavioural outcomes," says Cham.

Cham is frustrated by the media's often 'Luddite' approach to technological change. She is anxious to dispel the myths with which the media surround each new development: she dismisses the recent media-stoked portrayal of Artificial Intelligence (AI) as humanoids with the capability to out-think and 'turn against' their creators: "The notion of what an AI is in the media suggests that we will have metal humanoids walking around the workplace any day now - it's wildly misleading. AI will be embedded in the design of the future environment ... A dystopian fear of technological innovation is as useless as a utopian belief that technology is going to save us; they are just polarised and ridiculous arguments. We have always been technological creatures since the handprint on the cave wall. We will not be overtaken by our technology - we will continue to integrate with it as we have been doing for millennia. We're cybernetic already," she says.

# A friendly voice

## Home telecare systems for the elderly

The UK population is ageing as a result of increased longevity and reduced fertility. It is estimated by the ACTIVE Project (University of Leeds, 2011-2014) that by 2034 the population over 65 will significantly outnumber that aged under 16 (23% and 18% of the whole, respectively). The 'oldest old' (those aged 85 or above) age group is also projected to grow faster in future, numbering 3.5 million people by 2034 and making up 5% of the total population.

At the same time, the number of people who might act as potential care-givers, such as family members, is reducing, due to significant demographic changes, in particular, the decline of fertility, the patterns of marriage and parenting, the greater geographical dispersal and women's increased participation in paid employment. All of these factors have implications for care provisions within the family; it is within this context that ageing-in-place and telecare solutions are being proposed.

In the awareness of these socio-economic and political factors, Gigliola Brintazzoli's quasi-ethnographic research was based on interviews and observation of 16 older telecare users aged 61-95, living in East Sussex and not affected by severe cognitive impairment. Findings indicated that telecare has a significant impact both on home and the provision of care: in particular, older people revealed the relevance of aesthetics of the home and how the introduction of telecare might have an influence on them.

Notions of care in person as juxtaposed to care at a distance proved to be not so clear-cut; it is argued that care at a distance, such as telecare, can be as 'human' and intimate as care in person.

A possible explanation might be the personalised relation between older users and the telecare provider, whose members of staff are perceived as friendly and helpful. Interestingly, the 'human touch' of the local telecare provider suggests that telecare may not be perceived as a 'cold' technology, but, in the words of one of the research participants, as "a voice on the other end of that [alarm unit], the minute I'm in trouble..." This finding highlights how telecare is perceived not as the mere sum of technological devices, but as a care network. As such, it is able to make older people feel both safe and reassured in their own homes.

Gigliola Brintazzoli is a research student supervised by Professor Flis Henwood and Dr David Harley.



# Cyber terrorism

## Securing our communications infrastructure against attack

5G, the next major phase of mobile telecommunications standards, is expected to arrive around 2020, giving mobile users the ability to perform much more powerful tasks at greater speed. In fact, Samsung have predicted that we will be able to download an entire film to our devices in one second. Major changes to the existing telecommunications infrastructure will be needed to support these services. Mobile traffic is currently reliant on these 'macro-cells' – base stations with high-level antennas which cover large areas. But with mobile data exploding, cells covering smaller areas are required. The Cloud-Enabled Small Cell (CESC) concept, which enables cells to cover a smaller area and access cloud computing when needed, will free mobile telecommunications from reliance on macro-cells and enable a more flexible and responsive system. However, this enhanced ability will also produce some very challenging security problems

SESAME is an EU funded project with twenty European partners set up to protect European power and communication networks from cyber attack. It is part of the European 5G Public Private Partnership (PPP), a European wide initiative supported by industry manufacturers, telecommunications operators, service providers, SMEs and researchers. Professor Haris Mouratidis is leading the team from the University of Brighton, investigating 5G infrastructure, analysing potential security threats and proposing alternative security controls to countermeasure those threats.

Mouratidis is involved in a raft of projects which explore the security implications of open and dynamic online services, like those created in the context of Cloud Computing and 5G telecommunications, but also Big Data and the embedding of computing devices in everyday objects – the Internet of Things. These developments all provide huge benefits,

such as easy exchange of information, faster processing of data and 24/7 access. However, security worries mean that potential users are reluctant to outsource sensitive data to these services because they are concerned about how online providers might use this information. In fact, users may be provided with little or no information as to when and how their data will be used. Organisations like the Inland Revenue and the NHS collect, transmit, share and collate huge amounts of personal data, yet give little information to their users about potential future use.

Issues around citizens' privacy are an increasingly important aspect of data storage and use, particularly in situations where, in many cases, individuals are obliged by law to share their personal information. For example, completing a self-assessment tax return involves providing the Inland Revenue with a considerable amount of sensitive financial information. Any mechanism that reassures users that their data is being used appropriately is likely to increase trust in online services.

The VisiOn (Visual Privacy Management in User Centric Open Environments) project, funded by the EU Horizon2020 programme, is a collaboration between academia and industry to develop ways that online services can meet the privacy needs of both citizens and public organisations. The project has developed the idea of Privacy Level Agreements (PLAs) to strengthen the transparency and trustworthiness of online public administration services. PLAs aid users to understand how their data is used as well as providing a set of criteria against which they will be able to assess and control the level of risk to their privacy. It also provides insights into the potential monetisation of their digital personal data and allows them to manage this. The potential conflict between the demand

---

Often a threat that looks innocent at the outset may develop serious security implications further down the line.

---

for systems which allow for collaboration and the need for secure systems is at the heart of Mouratidis' research on protecting ports from cyber attack. MITIGATE (Multidimensional, integrated, risk assessment framework and dynamic, collaborative Risk Management tools for critical information infrastructures) is a collaborative research project co-funded by the European Commission under Horizon 2020 that is developing a computing platform enabling port operators to understand the cyber threats and risks they face in terms in day-to-day operations, particularly when exchanging information with other stakeholders including ship owners, logistic and freight companies.

The challenge, Mouratidis says, is in this *chain of collaborations*: "Often a threat that looks innocent at the outset may develop serious security implications further down the line. It is important to try to understand the chain of events that can lead to cyber attacks and how they may originate in different parts of an organisation rather than just the central computing infrastructure."

The contribution of the research cluster SenSe (security, defensible software system research cluster), led by Mouratidis, to these projects has helped to extend the university's expertise and unique skills in the areas of security and privacy by design:

"Although security is a very broad area of research, colleagues outside Brighton are starting to recognise our expertise in security requirements engineering and security/privacy by design which holds exciting potential for future collaborations," says Mouratidis.

# Smart specialisation

An economic boost for Brighton

The city of Brighton and Hove has one of the highest numbers of university graduates relative to its population, being ranked within the top five cities in the UK. You would expect an economy with such a pool of talent to be relatively fast-growing, wealthy and dynamic, but the reality is that this pool of talent is not being translated into high rates of economic growth and the shared prosperity that brings.

Professor Marc Cowling's research is concerned with identifying the reasons for the lack of rapid economic growth in Brighton despite its key advantages: its proximity to London, two universities, a vibrant arts and media community, and the dynamic creative digital cluster that was highlighted in the BrightonFuse project, a two-year, £1 million project funded by the Arts and Humanities Research Council aimed at supporting and enhancing the connections between creative, arts-based practitioners in the city and the digital, media and technology cluster. "The reality is that although Brighton has a lot of key economic development initiatives and potential, things are not functioning in a connected way. There are also physical constraints on planning and economic development of land in Brighton because of its geographical situation, being bordered on one side by the sea and the other by the South Downs National Park. It also has the problem of expensive but poor quality housing," says Cowling.

He was asked by the Smart Specialisation Hub, (an initiative delivered by the Knowledge Transfer Network and the National Centre for Universities and Business to promote innovation throughout England) to investigate potential development in Brighton through a Smart

Specialisation Strategy (SSS). This is a way of evaluating, assessing and harnessing regional or local economic agents and coordinating activity between them to create opportunities for growth. The SSS (which has now moved on to Smart Growth Strategy, recognising the need to establish and then grow new businesses) was an EU initiative designed to channel regional development funds. The strategy acknowledges that each city, region or county has inherent historical advantages and that it is therefore more efficient to allocate resources to these areas rather than those which don't have an established competitive advantage. It is therefore a means of channelling resources in a very focussed way to achieve the maximum benefit.

Cowling is interested by the dual role that entrepreneurs play in an area like Brighton. He says: "Attracting and supporting entrepreneurs is key to local economic growth. Entrepreneurs perform a dual function as economic drivers. As well as creating businesses and (in some cases) employing people, they also have a secondary effect on the economic identity of a region. Highly talented workers, who don't want to be entrepreneurs themselves, have significant spending power and like living in an entrepreneurial atmosphere. Entrepreneurs often provide the kind of bespoke goods and services which are in

Entrepreneurs often provide the kind of bespoke goods and services which are in demand from highly talented workers, creating a virtuous economic circle.



demand from highly talented workers, creating a virtuous economic circle." Cowling explains that this situation can just as easily go into reverse if entrepreneurs decide to leave an area, or the conditions for creating and sustaining a smaller businesses are absent.

Universities also have a dual economic role. Firstly, they are huge employers in their own right. In most cities in the UK, a university is typically the third biggest employer behind the NHS and educational institutions more generally. As well as a direct economic contribution, universities also have an indirect one, which is to create knowledge and talent.

Knowing the state of the local economy is valuable, but it doesn't necessarily identify what the problems are; nor does it lead directly to a strategy to address those problems. To do this, the SSS team has been working with local firms to understand how they innovate, what problems they have, and how these might be resolved.

During the early days of the emergence of the Brighton digital cluster, firms drew heavily on the advanced interdisciplinary research that was being undertaken in the Department of Informatics at the University of Sussex. As firms applied this knowledge and grew, the skills they needed evolved, and the focus was more on development than research. Today, as some of the initial technologies have matured, the local digital cluster now needs new technical inputs to enable it to compete effectively in international markets.

Understanding these changing patterns of interaction between the local economy and the two local universities has seen them all adapt. Brighton and Sussex universities are now working closely together, and both are tailoring their teaching and research to the needs of the local economy. One feature of the local economy is that graduates enjoy the quality of life so much that they tend to stay on in Brighton much more than is usual for a university town, allowing the universities to feed new skills into the local economy.

Most of the cities which were struggling economically a generation ago – Bristol, Manchester, Leeds – have undergone economic transformation as a result of successful partnerships between planners/ local authorities, developers and industry

"Most of the cities which were struggling economically a generation ago – Bristol, Manchester, Leeds – have undergone economic transformation as a result of successful partnerships between planners/ local authorities and developers and industry," says Cowling, "and Brighton is 'behind the curve' in terms of these kinds of partnerships." The key agents in Smart Specialisation are local authorities and policy makers because they control the provision of services. Together with universities, other academic institutions and talent and industry entrepreneurs, Smart Specialisation can work together to develop a bespoke and innovative approach. Cowling's work led to the development of the local SSS in the greater Brighton region, which has seen local government, industry associations and the Universities of Brighton and Sussex do just this.

The Greater Brighton Economic Board has instigated a six-year programme of investment in jobs, housing, business and skills support. It includes proposals to support the regeneration of nearby Newhaven and Shoreham Harbour and Burgess Hill, as well as establishing a network of growth centres at Preston Barracks and New England House in Brighton. It aims to develop a region that is attractive to businesses, providing the amenities and infrastructure they need to thrive, working with universities and colleges to create high value jobs and to develop skills systems that are accessible and meet the needs of a changing economy.

# Backyard Brighton

## A mobile app for accessing local history

Marcus Winter and John Riches explore how technology can help local residents and visitors to engage with images and stories from people who lived in the 'slums' in central Brighton before they were demolished in the 1940s.

A first step in this collaboration is a mobile application that presents one of QueenSpark Books' iconic publications, *Backyard Brighton*, as a serendipitous locative media experience: users of the application receive notifications when passing historic places in the streets of central Brighton and then have the option to view related images, read passages from the book and listen to audio recordings on their mobile phone.

Key questions in the project are whether presenting images and stories in this way can help to make the experience more authentic and relevant to people, and whether mobile phones as a delivery channel can help to reach new audiences who might be less inclined to read a book with the same materials.

Early field trials suggest there is great enthusiasm for the mobile application among the residents of Brighton & Hove, with a wide range of opinions on how it could be further developed. One of the key findings is that some people have difficulties relating historical



photographs to the present-day environment if they are presented flat on the screen, suggesting that alternative presentations, perhaps overlaying photographs onto the real world, might be more suitable for this purpose.

Future work will help to investigate this aspect further. The current project is funded by the Community University Partnership Programme with the aim to foster sustained community involvement with benefits for all partners. It trains QueenSpark Books' volunteers in geo-referencing materials and involves students on the university's postgraduate Computing and User Experience courses in the development and evaluation of the mobile application, providing rich learning opportunities and making research more open and accessible.





*Responsible Futures focuses on empowering academics and engaging activists, policymakers and private sector's operators, amongst many others, in implementing a common vision for a better and more inclusive tomorrow.*

Prof Marina Novelli  
Academic Lead: Responsible Futures

## Introduction to Responsible Futures

Operating in a sustainable and socially responsible manner is paramount in a world characterised by shifting environmental, economic and political conditions. There is little doubt that creating socially and environmentally just societies is a core challenge for the twenty-first century.

Responsible Futures focuses on empowering academics and engaging activists, policymakers and private sector's operators, amongst many others, in implementing a common vision for a better and more inclusive tomorrow.

We aim to achieve this by crossing a number of disciplinary boundaries and by engaging in creative, innovative and visionary research and practical explorations. Through our multidisciplinary research and enterprise, we seek to inspire environmental, social, cultural and economic transformations.

In Responsible Futures, we engage with a broad spectrum of issues, from social exclusions, migration, mobilities and economic inequalities, to environmental degradation and conservation, climate change, technologies, material artefacts, science and health policies and practices. How these are developed and implemented matter to the world we live in.

By drawing on combined knowledges and a shared vision, we will forge sustainable collaborations, start-ups, spin-offs and change management interventions, allowing us to work with established and new partners and see our research and enterprise impacting on people's everyday life, informing communities of practice, developing forces for responsible action and driving the success of our society.



## Niche tourism

### New routes to a more sustainable future?

Travel and tourism contributes 9.8 per cent of global GDP and is expected to grow on average by 4 per cent annually for the next ten years. This translates to one billion international travellers around the world, in addition to one billion more domestic travellers. In this context, the integrity of the destination we visit becomes paramount, both in terms of its long-term survival and the action we need to take for the preservation of the very resources that attracted tourists in the first place. The United Nation General Assembly declared 2017 as the International Year of Sustainable Tourism for Development, which is an opportunity to place sustainability at the heart of tourism businesses and to inspire many more consumers to engage with it.

Image: P2P International - Meeting with Kombo Beach's Fruit Sellers (The Gambia)

Niche tourism aspires to be a more stable, higher-yielding and sustainable form than conventional tourism, delivering tangible and equitable benefits to communities, which may allow all those involved to flourish in a sustainable manner. However, Professor Marina Novelli also highlights the dangers involved in approaching niche tourism only as a commercially focussed strategy, which is traditionally used by travel operators. She explains how reacting purely to shifting market demand will not deliver responsible forms of tourism that promote and enhance long term inclusive growth and sustainable development.

"Globally, tourism is increasingly portrayed as aiding sustainable development and



international development agencies, national and regional development bodies, private and third sector organisations see it as an important tool for socio-economic development, cross-cultural integration, peace building and environmental preservation," says Novelli. In her book, *Tourism and Development in sub-Saharan Africa: Contemporary Issues and Local Realities* (Routledge, 2016), she highlights how niche tourism has proved to play a key role in market diversification, inclusive growth and sustainable tourism development in some of the most peripheral locations in the world. However, despite its many benefits, Novelli's recent research also highlights a number of problems; for example digital innovations, which include sharing economies like AirBnB or Uber, have created new local and regional development opportunities, but are criticised for delivering unfair competition, condoning tax avoidance and presenting a threat to health and safety and disability standards, defeating the ambition to operate in a more sustainable and responsible manner.

Novelli acknowledges that transforming tourism is not an easy undertaking, her concern is that the ways in which sustainable tourism is currently promoted will not bring about the necessary changes to facilitate sustainability in the longer term. To address such a challenge, even if only at micro-level, Novelli developed Peer2Peer (P2P) International, an initiative delivered in The Gambia, seeking to facilitate capacity build through niche tourism

education. Since its inception, in 2007, P2P International has provided an innovative context-based learning environment to students studying tourism, events, hospitality and sport in collaboration with sponsored Gambian participants. By creating mutually beneficial educational exchanges, enabling participants to share knowledge about sustainable niche tourism principles and practices and sport coaching, the initiative has managed to remove some of the stigmas, myths and misconceptions about the African continent. Over its ten editions, the initiative has benefitted over 200 Brighton students and over 100 Gambian participants and some 1000+ young learners have benefited from the P2P, by being exposed to a unique learning opportunity.

Simon Gibba - chair of our partner organisation Sandele Foundation said: Over the past ten years there have been a number of micro enterprises which have emerged and proliferated in their locality from riverside explorations to marine turtles conservation, participants have grasped the principles of niche business development and have taken this forward with a number of our educational programmes run following the same principles of Peer2Peer International." Gibba suggests that, as well as providing opportunities for niche tourism, P2P International can fulfil local potential and provide sustainable development openings in other fields far beyond tourism, which is what P2P International will continue doing in the future.

# Going with the flow

## Understanding the planet's river systems

It is no surprise that water is vital to the world as we know it. Less well known is how our collective responsibility for the planet's water manifests itself in hundreds of ways, some of which we may not be aware of, and with effects that can have global implications.

Maintaining healthy freshwater ecosystems is a case in point. Our waterways provide us with numerous resources, many of which are not immediately apparent. Aside from the obvious provision of water for drinking and waste disposal, they also purify water, contribute to nutrient cycling, control floodwaters, provide opportunities for recreation, and much more. They support diverse communities of organisms, which are essential for the functioning of these ecosystems and provide a crucial source of food for many terrestrial species. Despite this, freshwater ecosystems are some of the most impacted globally, and are continually degraded by human activity.

Freshwater environments face a range of dynamic challenges now and in future. Accelerated by factors associated with climate change such as flooding and drought, there is a need to re-evaluate water management techniques and the way water is used and valued. Projects at the University of Brighton in a number of disciplines are making an impact on these problems.

Funded by the Natural Environment Research Council and the Environment Agency, one research strand

investigates the use of freshwater invertebrates to identify rivers and streams that are impacted by alterations to their fine sediment conditions. This widespread cause of ecological degradation is of global concern and is the result of land use, the removal of riparian vegetation, changes to river morphology and modifications to flow regimes. Freshwater invertebrates are excellent indicators of the conditions of rivers and streams. By supplementing expert knowledge of the invertebrate characteristics with empirical data from long-term monitoring by the UK environment agencies, the research helps diagnose the causes of ecological degradation.

In other research, Dr Mary Gearey focuses on fresh water management and governance from the perspective of political ecology and sustainability. She explains, "my focus lies in critiquing how governance regimes enact sustainability objectives, and in what ways local knowledges about water resource sustainability are included in policy development and implementation. Together, strategies must be found to deliver clear messages around sustainability." With fieldwork meeting residents in waterside communities along the River Adur in West Sussex, Gearey catalogues data to help determine what kind of changes to water resources people will accept and support.

Another project has produced evidence that encourages watercress companies to avoid contamination. PhD student Asa White, under the supervision of Dr Neil Crooks, Dr Angelo Pemetta and Professor Chris Joyce examines how nearby rivers might be affected by the runoff from these farms, particularly in the number, physiology and behaviour of the inhabitant fish. The pristine

Images: Right: Turtle SOS The Gambia - baby turtles hatchling at Sandele Eco-retreat (Kartong, The Gambia).

Left: Allahein's Riverside Explorations (The Gambia)

environments in which trout and salmon fisheries are typically located are often shared by watercress farms and their impact on the environment includes the harmful effects of the compound Phenylethyl Isothiocyanate (PEITC), the peppery anti-herbivorous content of the plant. The solution is straightforward and effective: collecting the water in a settlement pond to allow time for the compound to break down, so that the water can be safely returned to the river.

Professor Phil Ashworth's research takes him to the great rivers of the Americas, examining sand-bed rivers, which dominate the drainage of the earth's surface. "Despite the environmental, social and economic significance of these large rivers, we have previously struggled to produce robust models of how they transport their sediment, how they change over time, how they produce the variety of channel patterns we see in the world, and how rivers respond to a change in relation to environmental factors such as climate, sediment supply and human interference," says Ashworth.

Together with his University of Exeter colleague Professor Andrew Nicholas, Ashworth is leading a National Environment Research Council (NERC) funded, three-year project, which is quantifying the dynamics of the South Saskatchewan River in Western Canada. Field data is used to set-up and then validate a numerical model of this type of sandy braided river that will then be used to predict how change occurs in future decades. The resulting models of river evolution inform engineers who are predicting the depth of erosion onto buried pipelines and also oil companies who need to understand the geometries of ancient rivers and sediments that now host oil and gas.

This work, as with many explorations of water, also has more surprising applications: the research was recently referred to in the journal 'Science' where it was suggested that sedimentary deposits, similar to those recorded in the South Saskatchewan River, may provide compelling evidence that water once flowed over the Martian landscape.

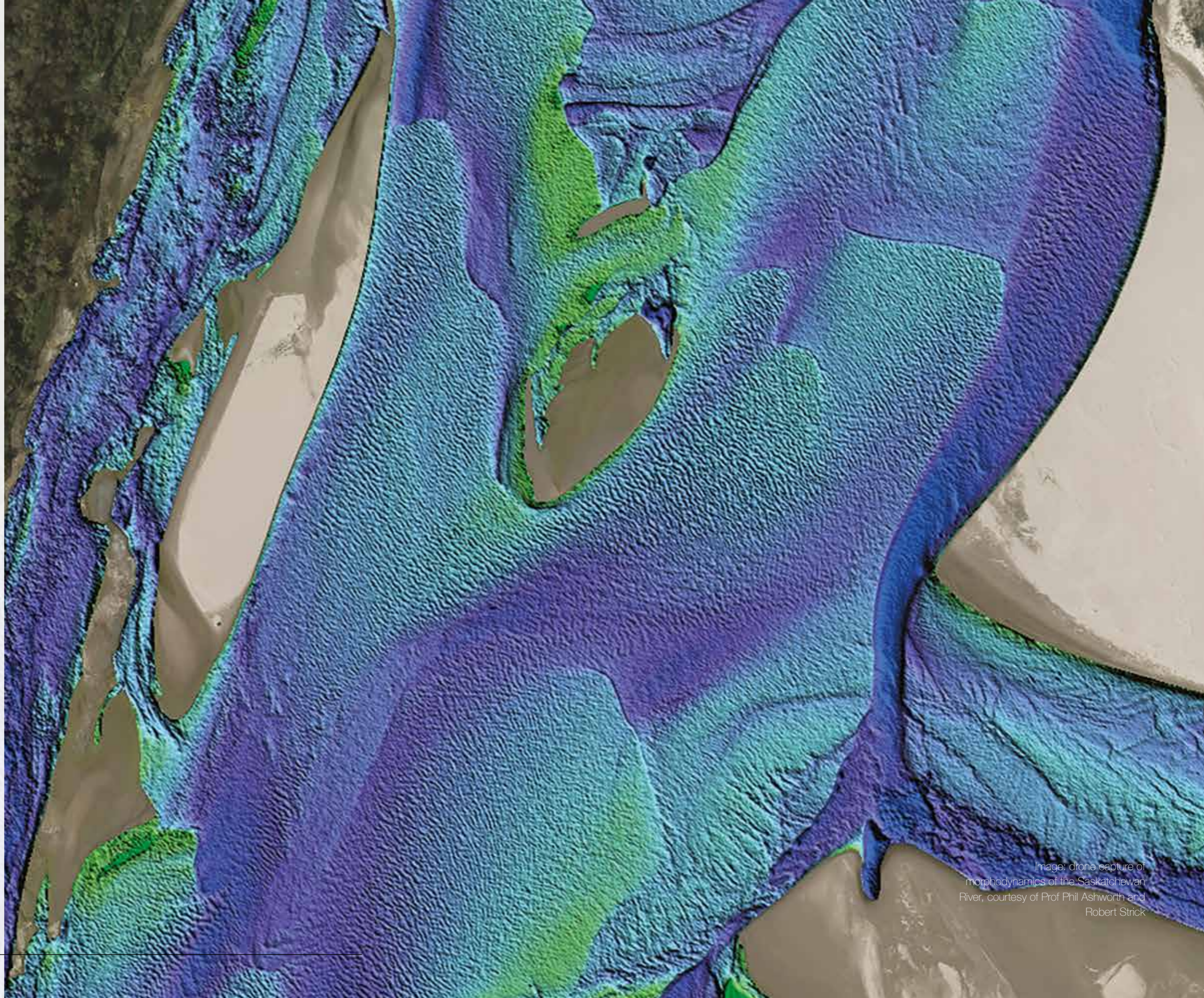


Image: drone capture of morphodynamics of the Saskatchewan River, courtesy of Prof Phil Ashworth and Robert Strick

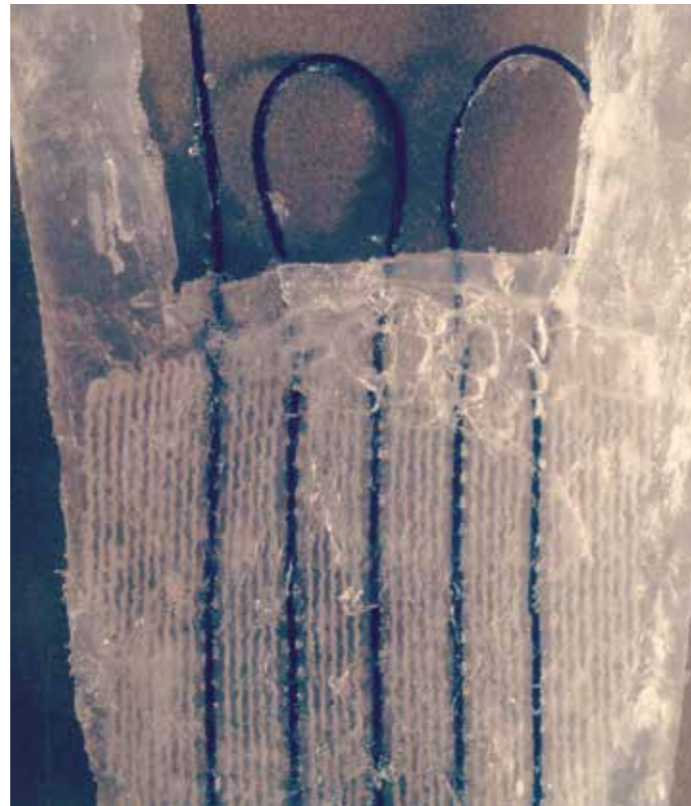
# Responsive materials

Architectural solutions in earthquake environments

The effects of earthquakes on the built environment can be devastating to many communities around the world, and any mechanism that provides early warning of structural changes or damage to affected buildings is an important step forward in preventing injury and fatalities.

An interdisciplinary project led by Catriona Cheyne at the University of Brighton has brought together architects, textile designers, nanotechnologists and engineers to design a specialist textile that can be embedded by the construction industry within buildings to sense movement, transmit data in real-time and to warn of potential structural failure.

The structural health monitoring system (SHMS) consists of a conductive nanotube polymer composite, which is placed into a woven textile that can sense structural strain. This has been developed by a company Nanoforce, a spin out from Queen Mary University of London. The fabrication and testing of the material has been developed through multiple different types of weave and mix of yarns. Throughout the fabrication process, the future visual impact of the application of the textile within a building system was considered alongside technical functionality to enhance usability through visual clarity.



The next stage of the research is to test the fabric as a resin-based composite, laminated to a section of a building element in both a static and dynamic state. During future testing the mechanical properties of the textile will be customised through the choice of weave and yarn to suit the needs of specific building elements.

The wider ambition of the research team is to develop a sophisticated SHMS that can monitor both the entire building whilst indicating the exact locality and extent of any damage via monitoring and analysis of electrical impulses generated by the conductive nanofibres in a flexible textile membrane. This would give both a holistic and detailed picture of the structural integrity of any construction in real time and will be especially needed post disaster to reduce the cost of human life.



# An experiment in space

Thermal management in zero gravity

The rapid growth in the number of complex electronic devices now in operation has resulted in an increased need to manage the heat emitted from fuel cells and batteries. Devices include vehicles powered by electricity, solar concentrators and LED appliances, all driving innovation in thermal management and a rapidly expanding international market for this kind of technology. Heat management is a complex process, particularly in space where there are specific challenges; solutions to control the temperature of satellites must operate under conditions in which maintenance and repairs are not possible, so reliability is a critical factor in their design.

Passive thermal devices such as heat pipes are one of a variety of solutions that offer heat transference with no moving parts or maintenance required, offering an extremely efficient means of transferring heat through a combination of the evaporation and condensation of fluid. In space, heat pipes have been used in various configurations since the 1950s and are recognised as a robust means for managing critical heat transfer problems in orbiting aircraft and during interplanetary missions.

Professor Marco Marengo is leading a project to develop new mathematical tools to aid the design of innovative thermal management systems: "Our project can best be summed up as 'better cooling for powerful electronics'," he says. "The worldwide market for heat exchangers and

thermal management systems is driving demand for such things as heat recovery systems, fuel cells and batteries for electric vehicles, but the cost and difficulty in designing new systems is high. This is particularly true of applications used in space, where thermal management can represent up to 15 per cent of the cost of a satellite. Our project aims to further close the gap between our ability to design and develop such systems using state-of-the-art numerical simulation."

In order to test the results of the simulations the team have to run experiments in microgravity. This is created through the use of parabolic flights. These are a little like a roller coaster in that the plane is initially pulled up to approximately 45 degrees and then 'pushed over' the



top in a manoeuvre which produces micro-gravity for approximately 20 seconds. These are similar conditions to those in an international space station or a satellite. This environment enables a much larger pulsating heat pipe to operate than on the ground due to the properties of liquid in micro gravity. Without gravity more heat is dissipated, making what is happening inside more clearly visible, and giving the team a better understanding of the processes because everything is amplified.

The pulsating heat pipe is relatively cheap to produce and perfect therefore for new developments like the cubesat – a small cube-shaped satellite. Somewhere between a drone and a satellite, their life in orbit is much shorter than their larger counterparts, only maybe two or three years, but they can be produced at a drastically reduced cost. Hundreds may be launched at one time, creating a constellation of these nano-satellites, which can be used for surveillance, traffic control and tracking forest fires. There is also the possibility that the heat pipe can be produced out of a flexible polymer, which would mean it could be used in a deployable system, for example in a satellite with two photovoltaic panels which open in orbit.

It is hoped that the new technology arising from the project – the Hybrid Pulsating Heat Pipe - will go aboard the International Space Station in 2020 with the support of the European Space Agency as part of British astronaut Tim Peake's second space mission.

On the ground the team is also working on other thermal management projects. An Innovate UK project with Tata Motors UK will investigate the building of a larger thermal network inside their fully electric vehicles to address the challenges in thermal management of electric cars which, without the waste heat used by petrol/diesel engines for heating during winter, use considerable amounts of energy for heating and cooling purposes.

Heat control in batteries is another application with huge potential as lower temperatures result in much longer battery life. Another interesting application which Marengo hopes to develop is in more efficient heat transference for solar panels.

Marengo is working with a very large international consortium, including teams in France, Italy Brazil, Japan and Holland; all working closely on different aspects of the project and with whom he communicates on a daily basis on these extraordinary developments. One of the deliverables of the project is that the University of Brighton will host a European Workshop on 'Wickless Heat Pipe Technology' in 2019 to present the results to selected industries and academics. Before that, the public will get a taste of the research through the British Science Festival 2017, with the team providing an entertaining public demonstration, which will measure the acceleration speed at which microgravity occurs on the roller coaster on Brighton pier.



HEALTH4LGBTI

## Reducing inequalities in LGBTI healthcare

What are the particular physical and mental health care needs of lesbian, gay, bisexual, trans and intersex (LGBTI) people? How do inequalities in provision of care affect them, and how might such inequalities be addressed? This is the focus of research by Dr Nigel Sherriff and his research team, who are describing how inequality arises from a complex interaction of a range of factors. The 'Health4LGBTI' project is part of a two-year EU-funded pilot which began in March 2016 aimed at increasing the understanding of how best to reduce specific health inequalities experienced by LGBTI people. Led by Sherriff with Dr Laetitia Zeeman, Professor Kath Browne, and Dr Nick McGlynn, the research group is part of a wider European Consortium led by the Verona University Hospital in Italy which is conducting the project on behalf of the European Commission's Directorate-General Health and Food Safety.

Root causes of health inequalities include cultural and social norms that preference and prioritise heterosexuality and feelings of minority stress associated with sexual orientation, gender identity and sex characteristics; discrimination, and victimisation. Sherriff's focus is also on the overlapping inequalities that stem from discrimination and unfair treatment on other grounds of age, ethnicity, disability, socio-economic status and citizenship.

An example highlighted by the research relates to LGBTI people's interaction with health professionals. It revealed how lesbian women who were recovering from breast or gynaecological cancer were not offered reconstructive surgery due to the belief that they would be less likely to access this form of treatment. Some were also asked to discuss reconstructive surgery with their 'husbands' not taking into account those who may be in same-sex partnerships or without a partner. Such experiences are indicative of one of the most striking issues identified by the research team – the apparent large disconnect between LGBTI people's healthcare needs, and the knowledges, understandings, and expectations of health professionals. Overwhelmingly, the research demonstrates that there is a lack of knowledge and cultural competency regarding the lives and healthcare needs of LGBTI people. Despite these findings, many health professionals assumed that LGBTI people did not face discrimination in accessing healthcare services and some believed that LGBTI people were contributing to their own marginalisation. Many were not aware that the assumptions they were making about LGBTI people were in themselves significant barriers to providing appropriate healthcare.

Findings from a series of three inter-related studies, including a comprehensive scoping review, a scientific review and a focus group study, revealed the existence of key health inequalities, barriers and discrimination based on sexual orientation, gender identity and sex characteristics. As well as the lack of knowledge and cultural competence on the part of health professionals, research found evidence of heterosexism, homophobia, biphobia, transphobia and interphobia creating significant barriers to healthcare, aggravated by systems ill-equipped to deal with the complexities of gender identity along with laws and policies restricting access to healthcare for trans people in particular, with some even being refused appropriate medical services.

LGBTI participants report that the ability to be open with health professionals, vital for the provision of good healthcare, is hampered by assumptions that all patients are heterosexual and that their gender identity matches the sex that they were assigned at birth, without an awareness that a patient may be intersex. A result of repeated negative experiences can result in some LGBTI patients avoiding healthcare services altogether.

An integral focus of this team's research is to look at how health inequalities of this kind can be reduced. One such way is to ensure that health services are attuned through appropriate and mandatory training for staff and students across health systems including but not limited to, health professionals.





*The University of Brighton Healthy Future is a journey with our patients and communities; with them we will embrace challenges, deliver opportunities, restore quality of life.*

Prof Matteo Santin  
Academic Lead: Healthy Futures

## Introduction to Healthy Futures

*A journey with our patients and communities; with them we will embrace challenges, deliver opportunities, restore quality of life.*

Having our patients and communities at the heart of our research and enterprise is the drive of the Healthy Futures at the University of Brighton. As we look closely to the needs of our local community we offer forward-looking solutions for wellbeing, prevention, early diagnosis and treatments at a global scale.

Our complementary expertise converges in a coordinated effort to achieve five clear goals: to gain basic scientific knowledge informing pioneering technology for early diagnosis and treatments; to identify the causes and intervene with breakthrough solutions on environmentally-linked health hazards; to pave the way towards new methods of engagement with the public to improve awareness about health threats and to give voice to ethical and socio-economical views and concerns about equal access to medicine and its innovation; to facilitate the translation of medical advances into policy and practice; and to support industry in the adoption of innovative medical technology

Our innovative thinking contributes to the way our population will care for their physical and mental health and to the way policy makers, industry and practitioners will operate for the good of our communities. Among us we have scientists, engineers, medical practitioners as well as experts in social policies working together to address the big challenges of our time. For many years our researchers have engaged in international projects addressing wellbeing, promotion of health education and healthcare inequalities.

Among the many research programmes currently in progress, we research neurodegenerative and cardiovascular conditions, diabetes and cancer. We explore pathological pathways at molecular, cellular and physiological level. We study body adaptation and reaction to environmental stresses while we provide affordable technological solutions to protect people around the world from them and from infections. We develop biomimetic biomaterials for medical implants, and regenerative medicine as well as sensors for early diagnosis.

We want share our passion and determination for a Healthy Future with our communities. We want our presence to be felt among them.

# Breast Cancer

## Pathways to earlier diagnosis and better treatments

Breast Cancer claims over 11,000 victims each year in the UK, with over 55,000 cases reported annually. This means in their lifetimes one in eight women will develop breast cancer, the most common female cancer.

Among the complex set of causes that contribute to cancer progression and response to drug treatments, psychological stress has only recently been identified and still requires rigorous investigation in order to be more widely accepted. Dr Melanie Flint's team at the University of Brighton continues to succeed in researching and disseminating a new understanding of links between stress hormones and cancer and immune cells that might lead to better treatments and a reduction in drug resistance.

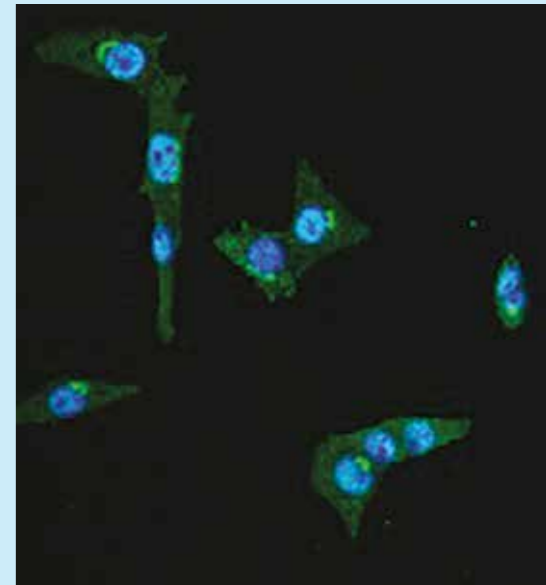
Flint is Co-leader of Brighton and Sussex Cancer Research Network, with research that has dealt with the effect of stress on cancer progression, chemotherapy and the immune system. Also adjunct Research Assistant Professor in the Department of Pharmacology, University of Pittsburgh, Flint is part of an international network in the fight to understand how cancer progresses.

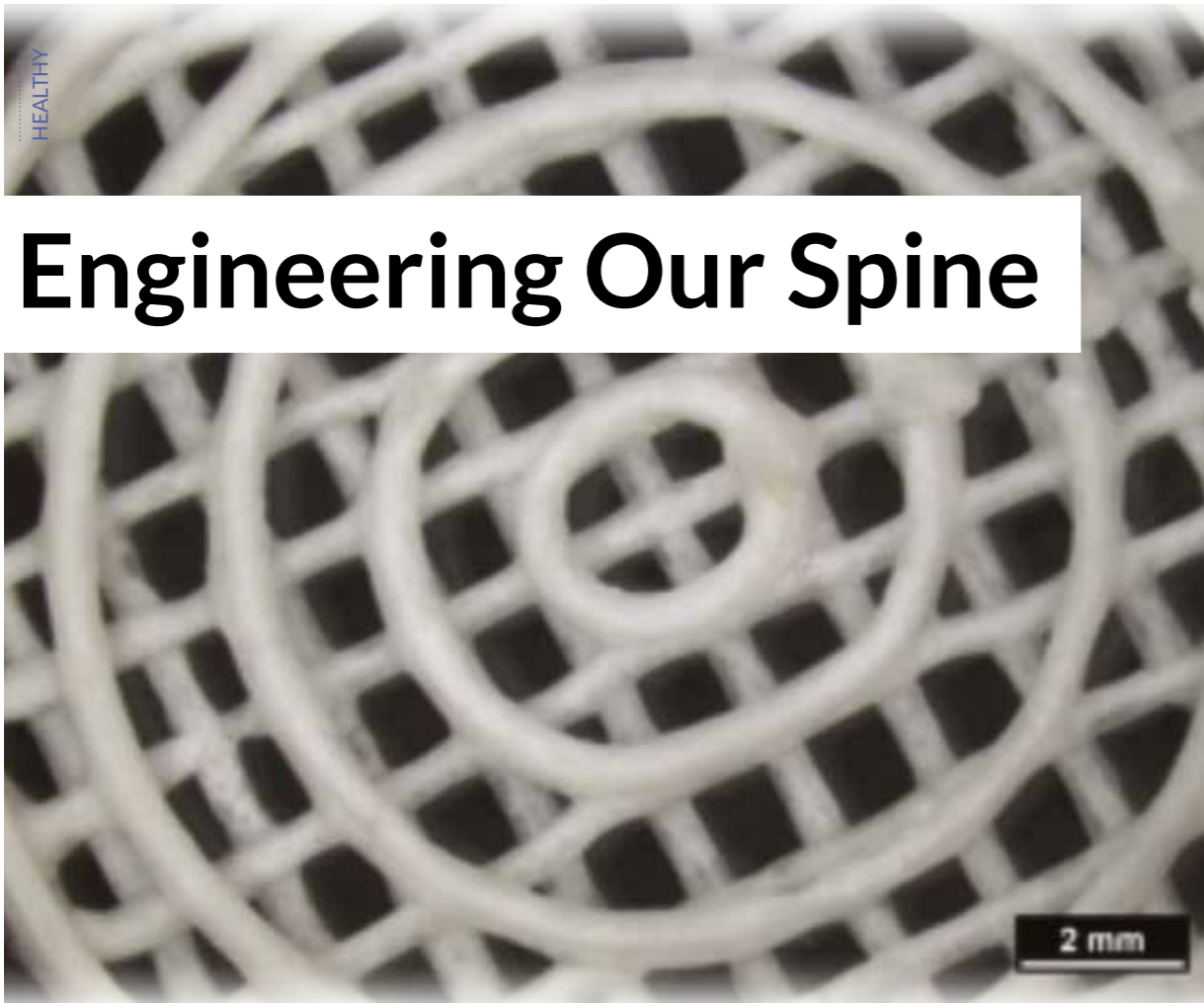
At the heart of these investigations is the role that stress hormone levels have on the efficacy of drug treatments through their impact on damaged DNA. One probable mechanism of DNA damage is the production of Reactive Oxygen and Nitrogen Species (ROS/RNS), a science familiar to anyone who heeds antioxidant labels on food packaging. These free radicals, while generated constantly as part of normal aerobic life can also be toxic to cells. Flint's study also looks at products of reactive oxygen, examining them alongside the cortisol levels.

A collaboration between Flint and Dr Bhavik Patel will now also design a model to specifically examine ROS/RNS levels in tumours, based on their successful multidisciplinary award from Cancer Research UK/EPSRC entitled 'A reactive oxygen and nitrogen species (ROS/RNS) monitoring system to study their role in cancer.' Worth £219,078 the project starts January 2018.

A relatively new avenue of Flint's research is the implication of cortisol on women with the BRCA gene; a tumour suppressor that helps to repair damaged DNA. BRCA mutation accounts for between five and ten per cent of breast cancers.

With funding from Breast Cancer Research Trust, Flint will now facilitate a joint project with Dr Ros Eeles from the Institute for Cancer Research to explore whether increases in the levels of cortisol in patients who present with the BRCA genetic makes them susceptible to the development of breast cancer. The findings will determine if biochemical responses that occur during psychological stress have consequences on the initiation of the disease. Such findings will provide valuable insight for patients and clinicians as to how stress might be a determinant in the aetiology of breast cancer, offering improved avenues for early intervention.





# Engineering Our Spine

Lower back or lumbar pain is one of the most common, chronic pain conditions in industrialised countries, affecting around 80 per cent of the population at some time during their lifetimes. As well as the negative affect on sufferers' quality of life, spine-related pain has negative economic implications, impacting on the ability to work, leading to absenteeism and therefore a loss in productivity. The negative economic consequences also extend to high spending on healthcare in order to manage the condition.

Most usually occurring between the ages of 30 and 50, pain in the lower back can be caused by a range of factors, but in the majority of cases it is linked to clinical evidence of inter-vertebral disc degeneration, the cartilaginous shock absorber interposed between the vertebrae of our spine. As a consequence, finding an effective treatment for disc degeneration is one of the most important socio-economic imperatives facing modern healthcare. The treatments currently available

are mainly based on the use of anti-inflammatory drugs or medical devices that limit a person's mobility and are prone to failure after a period of time.

A project currently underway at the University of Brighton is seeking to find solutions to these problems using regenerative medicine techniques to re-engineer the damaged spine. PhD student Ella Hodder is using a 3D printing process known as 3D-Bioplotting, with the

aim to create tissue engineered scaffolds personalised to the patient, in order to replace damaged inter-vertebral discs.

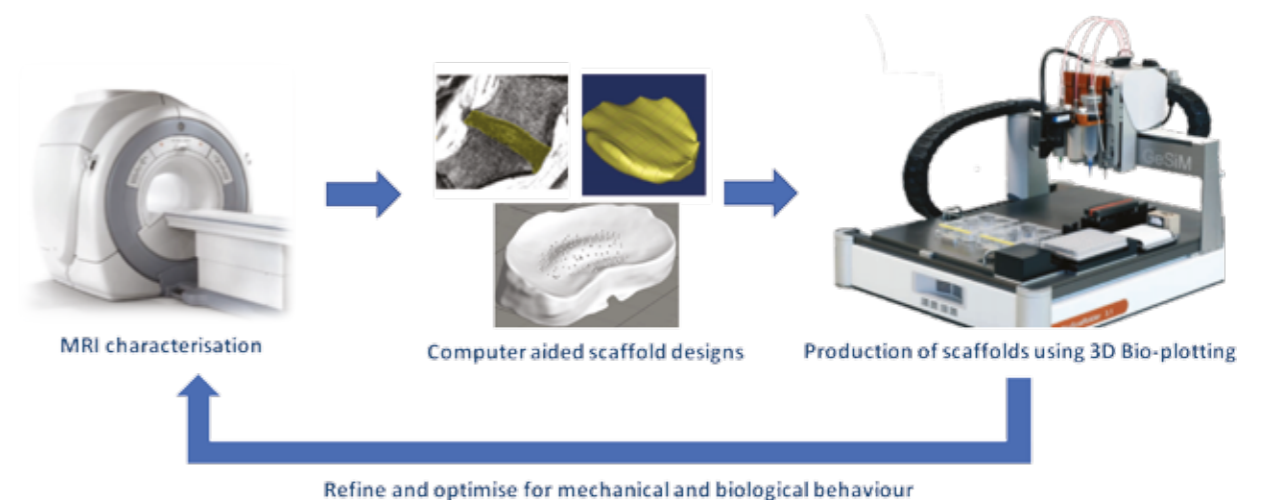
Following an MRI scan, data taken from the patient's spine is processed and enhanced by computer software to unveil the microstructure and external dimensions of both the damaged and adjacent level healthy discs. Modelled geometric information based on this data is then transferred to a sophisticated printer. Specifically chosen bio-ink materials containing living cells are then dispensed to reproduce the disc dimensions, and grown to become new tissue, to mimic the bio-physiological properties of healthy discs. The project has acquired an international dimension, with Hodder spending a three month period of study under the supervision of Professor Michael Gelinsky, a leader in the field of 3D-Bioprinting for tissue engineering at the Centre for Translational

Bone, Joint and Soft Tissue Research, Medical Faculty at the University Hospital of Dresden in Germany.

Hodder's study, entitled 'MRI-informed Biomimetic Design of Artificial Intervertebral Disc Scaffolds using 3D-Bioplotting' also employs expertise and supervision from two different areas of the University of Brighton. Dr Derek Colvill from the School of Computing Engineering and Mathematics (CEM) provides the 3D printing technology, while magnetic resonance imaging is provided by Professor Mara Cercignani and Dr Nick Dowell from Brighton and Sussex Medical School.

The intent is to produce personalised tissue engineering disc replacements, via rapid prototyping techniques – a development which could ultimately prove life-changing for many sufferers of spine-related pain.

**Aim-** to develop a **clinically feasible bio-fabrication** approach using **3D-Bioplotting** to generate **patient defined intervertebral disc (IVD) scaffolds** which sufficiently **mimic the bio-mechanical characteristics of native discs**.



# A new approach to treating diabetes

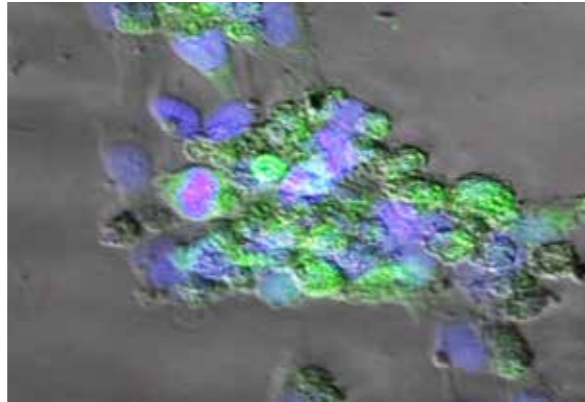
Four million people live with diabetes and nearly a quarter of a million more are being diagnosed each year. Diabetes is caused by insufficient or lack of insulin secretion by the pancreas and, if not treated adequately, can lead to complications which have severe impact on health. Potential complications include heart disease, increased eye pressure, foot ulcers and kidney damage.

Treatment is based on lifetime blood glucose control by insulin administration either through either injection or the use of an insulin pump.

However, some patients become non-responsive to insulin administration or they do not experience any of the typical symptoms related to low glucose levels and are at risk of sudden coma. One alternative is pancreas transplantation, but this is a major surgical procedure and a shortage of donors limits the number of these transplants that can be carried out.

Another approach involves the transplant of pancreatic islets. These are the tiny clusters of cells scattered throughout the pancreas that produce the hormone insulin. They can be taken from the pancreas of a deceased donor and implanted in the main vein of the liver of someone with Type 1 Diabetes. This minor procedure is usually done twice for each transplant patient, and can be performed with minimal risk using a needle under local anaesthetic.

Pancreatic islet transplantation has the appeal of being a non-invasive treatment but issues remain with its effectiveness: as a result of damage sustained by the islets during their isolation from the donor's pancreas as well as during the early phases of engraftment within the liver vein. After a week from the transplantation most of the islets die because of limited integration in the patient's tissue and the immunosuppressive regimen necessary to prevent the body from rejecting the transplant also has drawbacks in terms of side effects on the patient.



Two research teams of our university, the BrightSTAR team led by Prof Matteo Santin and the Diabetes Research Group led by Prof Adrian Bone, have been leading the EC FP7 project, NEXT (<http://www.thenext-project.eu>) to find ways to increase transplantation efficiency by protecting the islets from the immune response of the transplant recipient and enhancing their long-term survival by closer integration with the body's own system of blood vessels. This has been achieved through new biomaterials able to reconstitute islets from single pancreatic cells and vascular cells. This approach expands the opportunities for patients as the cells can be harvested from animals and the reconstituted islets can more rapidly integrate in the tissue of the patient.

The project has also developed bioreactors for the transportation of the islets in ambulances as well as new methods to determine the viability and activity of islets prior to transplantation. The work is an international collaboration with three companies AvantiCell Science (UK), CELLON (Luxembourg) and Explora (Italy) with additional input from the European Register for Pancreatic Islet Transplantation, University of Geneva (Switzerland) and the ISMETT, an international clinical centre for organ transplantation.

Improving the success rate of these transplantations will potentially offer many more people living with diabetes a better quality of life, with less hypoglycemic episodes and a reduction in long-term diabetic complications.

# Mosquito

## How understanding mosquito buzzing might alleviate the spread of disease

Diseases carried and transmitted by mosquitoes – including the Zika virus, malaria and yellow fever – are responsible for a range of debilitating illnesses and an estimated 725,000 deaths annually, affecting a large proportion of the earth's population.

Scientists at the University of Brighton have been studying mechanisms by which male mosquitoes use their 'buzzing' sound to detect females. The research could lead to the production of acoustic traps, better genetically-modified male mosquitoes and the disruption of mosquito mating, which, in turn, could significantly reduce their numbers.

Mosquitoes are well known for their annoying whine when they fly. The sound is produced by their wings which beat several hundreds of times per second. The male's buzz is typically higher in pitch than that produced by the relatively larger females. Mosquitoes use this frequency difference to detect and communicate with possible mating partners. Mosquitoes are more sensitive to sound than any other insect due to the remarkable properties of their antennae and auditory organ at the base of each antenna.

The researchers, Dr Patrício Simões, PhD student Robert Ingham, and Professor Ian Russell, from the University of Brighton's Sensory Neuroscience Research Group, along with Professor Gabriella Gibson from the University of Greenwich, discovered that the male mosquitoes' hearing organ is actually tuned to the frequency difference between its own flight-tone and a female's flight-tone. The researchers' work on this hearing mechanism, unique to the animal kingdom, is reported in the *Journal of Experimental Biology*.

Central to these findings was the discovery and description of a stereotypical acoustic behaviour – a specific sound signature – which male mosquitoes produce when they detect female-like sounds. This never-before described and quantified behaviour is only observed in free-flying males. It enabled the researchers to 'ask' male mosquitoes what sound characteristics are most attractive to males. Researchers "unexpectedly and surprisingly" found a mismatch between the best tones that evoked the acoustic behaviour and the best tones detected by the hearing organ at the base of the antennae. This mismatch is solved by the hearing organ detecting and amplifying the difference between the males' own flight tone and that of a nearby female.

Dr Simões said: "Our findings reveal that the remarkable hearing capacities of mosquitoes are based not on harmonic detection, as is generally accepted and described in recent papers and text books, but on the detection of acoustic distortion-products produced by the interaction of the two sounds."

"This discovery gives a new significance for mosquito swarming because it implies that male mosquitoes have to fly in order to acoustically detect, locate and orientate towards flying females."

Dr Simões said the full significance of this discovery is still being investigated but it holds potential interest for creating new strategies to control mosquito populations, especially for disease-carrying mosquito species.



Image- Naomi Graham, drawing used as part of study information for child participants.

# The experience of play

Examining the play of 6-12 year olds with Cerebral Palsy

The concept of play is one that is well known but is often difficult to define. All children have the right to play according to the United Nations rights for the child. Despite this, children with disabilities are often perceived to play less than their typically developing peers. Children with high levels of physical disability are often not a part of research due to the impact their disability has on their ability to communicate. Naomi Graham is interviewing children with Cerebral Palsy as part of her PhD research in order to capture their experience of play.

Visual media can be a helpful tool to increase the depth of data gained within qualitative research; the present research used videos, drawings, and showing of toys to help increase the opportunity for children to discuss their experience. Each child participating within the research was videoed taking part in a play activity chosen by them; this video was then played back within the interviews to prompt children to express their thoughts and feelings about different aspects of their play. Interpretive Phenomenological Analysis is informing this project; the process of analysing and interpreting the data is hoped to lead to interesting insights into the experience of play for the study population.

It appears that although the children reported some play experiences similar to their typically-developing peers, there are also some differences which are becoming evident within the findings. The children with Cerebral Palsy are discussing the normality of adult involvement in their play. This contrasts to typically-developing children who are reported to associate the presence of an adult with an activity being not play. It also seems that the children with Cerebral Palsy experience a heightened sense of freedom and movement within their imaginary and pretend play which may not be observable by an onlooker.

Naomi Graham is a research student supervised by Associate Professor Anne Mandy, Dr Channine Clarke and Dr Christopher Morriss-Roberts.

## Bacteriophage

### Developing effective ways to control infections

Antimicrobial resistance (AMR) is a significant global health threat. It is estimated that in the US and Europe alone, antimicrobial-resistant infections currently cause at least 50,000 deaths per year, with hundreds of thousands more dying in other areas of the world.

If we are unable to slow the acceleration of AMR, future consequences will be worse still. The recent government review on antimicrobial resistance has estimated that 10 million people a year could be dying as a result of AMR by 2050.

Dr Brian Jones and Dr Jonathan Nzakizwanayo, have been investigating a means of controlling infections associated with the use of urinary catheters. These devices are used in their millions across the world every year, but infection is a frequent complication of catheter use. The team has focused on a particular species of bacteria called *Proteus mirabilis*, which is a common cause of these infections and leads to extensive encrustation and blockage of catheters. This, in turn, leads to the onset of serious complications such as kidney infection and septicaemia, one of the UK's biggest killers. They have shown bacteriophage, viruses that specifically kill bacteria, may be used to combat *Proteus* infections and prevent blockage, and have the potential to treat other common infections related to the use of medical devices such as catheters. This insight could lead to new methods of preventing infections and could contribute to overcoming problems with antibiotic resistance.

Jones said: "Our work provides good initial evidence that bacteriophage can treat infections caused by *Proteus mirabilis* and prevent catheter blockage. This could lead to new ways of managing patients fitted with urinary



catheters, providing much benefit to a large number of patients, and it also contributes to reducing antibiotic use and tackling resistance."

However, Jones said more research was still needed as work was still in its very early stages: "We have a long way to go before we can be sure this will lead to an effective way to control these infections, but bacteriophage have been used extensively in other countries for decades, and the challenge of antibiotic resistance makes it important to look at using these promising alternatives to antibiotics. We think an important issue will be in developing ways to deliver bacteriophage as needed, which is a key aim of our ongoing work."

To address some of these challenges, the team has been working with colleagues at the University of Bath to develop new infection-responsive coatings for catheters. It is hoped these will deliver treatments, including phage, directly to the site of infection as needed, and could also be used to provide a simple visual warning to alert patients or carers that catheters are infected. Their recent work has also showed the promise of their prototype coatings in laboratory models.

The research is a collaboration with scientists and clinicians from Brighton, Surrey and Sussex Healthcare Trust, the University of Bath, Queens University of Belfast, Frontier Pathology NHS Partnership.



*The University of Brighton has the potential to offer a remarkably creative landscape for the development of ambitious research and the diversity and pluralism of its research community offers great opportunities for sustainability and growth.*

Prof David Cotterrell  
Academic Lead: Creative Futures

## Introduction to Creative Futures

Creativity brings into existence something new. Research is itself a creative act, leaping from the rigorously defined structures of a discipline towards something newly-made, something that will extend the reach of what knowledge can attain.

Creative practice is inherent across the breadth of research, witnessed in the way hypotheses are created for testing or the way new perspectives are created from digital practices. Our Creative Futures recognise the place of creative thinking in all research and give special consideration to tacit knowledge, lines of enquiry that require creative understanding and practice to make them known.

Some knowledge defies expression in words. It is here where creative work can be at its most intense and its most valuable in a process of research. Investigations are made at the level of human emotional experience: how does our empathy form or fail, what factors allow us a process exchange, how do we understand memory? Whilst the communicative potential of creative output is a staple of dissemination, and can be supportive of scholarship and discovery from other fields, it is at its most profound when the investigation is itself a set of creative acts and experiences. We encounter new knowledge when we create for ourselves, or when new thought is elicited from us by engagement with a creation.

To establish a space for Creative Futures is to recognise the breadth of knowledge types and to accept new areas of scholarly production. The university community is one of multiple practices, whether these are in the analysis of written material and the writing of new texts or in forms which are themselves evolving as scholarly tools – painting, dancing, fabric design, storytelling – or in forms based on evolving technologies and the network of creative productivity – telematics, generative code, smart textiles and gaming cultures.

Our creative futures are present in all enquiries, in everything that wonders what will be new beyond the new. Through this creativity we generate enterprise, advance fundamental science, challenge cultural and social discourses, and create new world-leading contemporary practice.

## Tell me a story ...

Brighton's digital storytelling work helps those in the criminal justice system

*"My partner was in prison for one year and I went to visit many times. I made this film to explore my thoughts and feelings about that time. It felt easier and more comfortable to tell such a personal story through film. It has been great to share it with very supportive people, some of whom have had similar experiences."*

*Hidden Voices* is a collaboration between the University of Brighton, Zap Art and Sussex Prisoners' Families (SPF) to raise awareness of the 'hidden sentence' faced by one of society's most invisible groups - prisoners' families and particularly young people and children. It uses the method of digital storytelling, through which expert-led workshops enable participants to make a two-minute narrative film, largely using still images and voice-over techniques.

Led by Ross Adamson, Isobel Creed, and Digitales, a digital storytelling consultancy company, over an intensive three-day workshop, the short films produced express the young people's experiences of the criminal justice system and give an insight into the issues faced and wider impact of imprisonment on families. The project also involved training for professionals working in the criminal justice system and skills development opportunities for young people experiencing homelessness from the Salvation Army Housing Association Foyer in Newhaven, East Sussex. Research attached to the project is investigating the ways in which experiences of family imprisonment are expressed through digital storytelling; the ways that stories come about through workshop processes and the collaborative nature of such storytelling.

The process has a number of benefits for the participants, which though significant can be difficult to quantify. Participants report that the workshops increase their confidence and allow them to discuss difficult issues in a safe environment. The sense of being listened to is very important. As one participant said about her experience:

"It has been a really good process; it was good to share some things I wasn't able to share with friends and family. It was good to hear those things back. To hear my story back."

What makes digital storytelling such an effective tool for these workshops is the brevity of the form: two or three minutes long, using a combination of photographs, drawings, video clips, music and a voiceover. Through the workshop process, facilitators guide participants through the craft of storytelling and the computer skills needed to produce the story. It is common for people to arrive saying they have nothing to tell, but rare for anyone to leave without having told a compelling story.

Using this method of recording recollections of the past creates a vividness of experience that captures the personality of each contributor. The stories are often emotional insights into the authors' lives. The distillation of sometimes life-changing experiences into the succinct format packs the emotional punch, while the combination of the narrator's voice with personal photographic images offers a powerfully personal vision of their life experiences in an easily distributed format. Here lies another strength – this form is particularly useful in giving people a voice in society who would otherwise go unheard.

An exhibition of the *Hidden Voices* project together with a screening of the digital stories was held as part of the Brighton Fringe in May 2017.

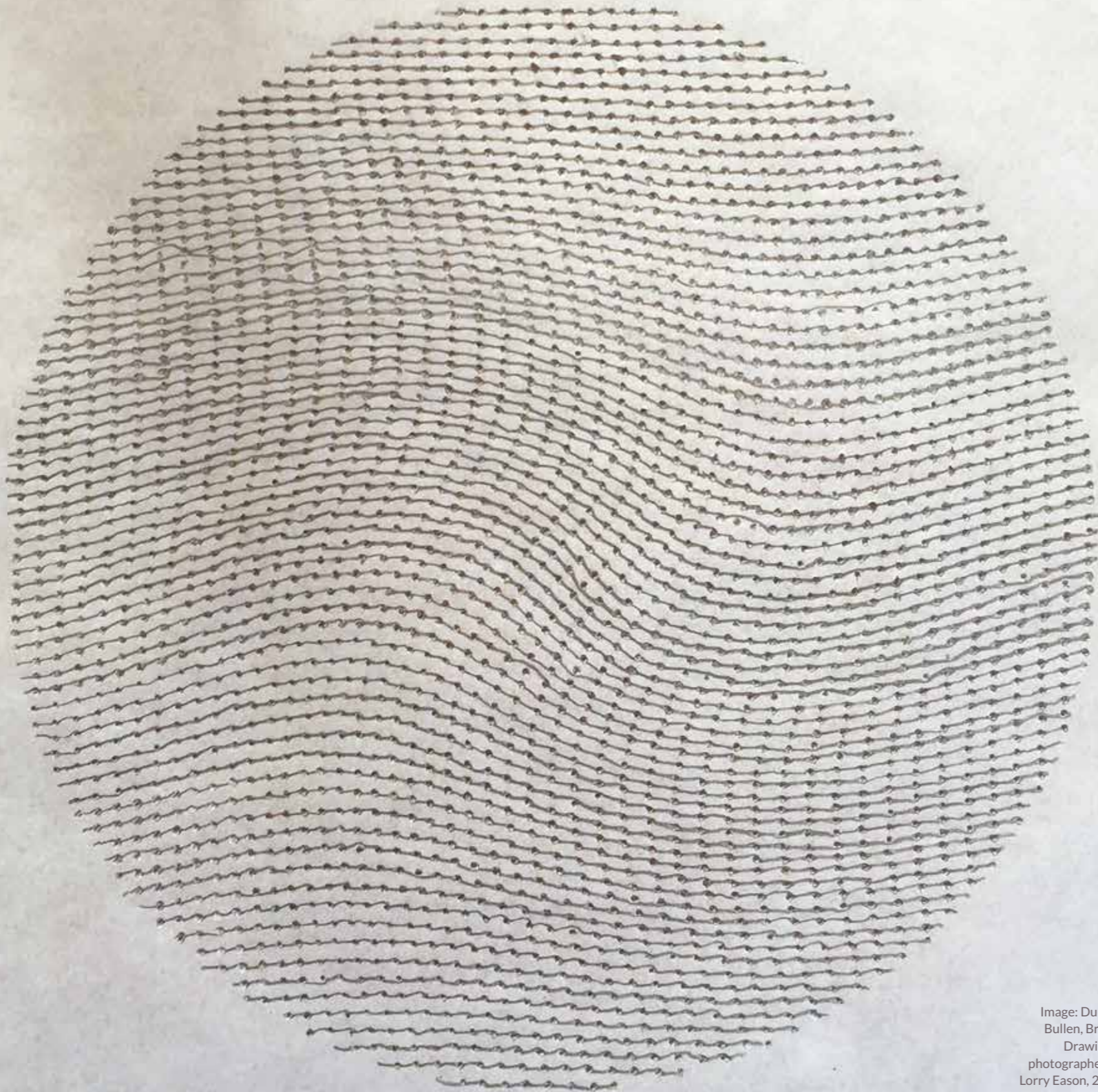


Image: Duncan Bullen, *Breath*, Drawing 2, photographed by Lorry Eason, 2016.



## Touching the world lightly

### The direct and physical process of drawing

Duncan Bullen's methodical and disciplined process of drawing is akin to mindfulness meditation practice, where each mark and the space between are an equivalent to an inhalation and exhalation of breath. Mindfulness meditation is not about transcending the here and now but is an activity of 'non-doing', a preparation for sustaining and cultivating awareness and attention of present moment experience, through focusing on one's breath. Bullen sees his non-representational manual drawing practice, the elementary activity of making one mark after another in repeated sequence, as a process that enables an experiential and intimate engagement with the world.

Bullen is particularly concerned with the direct and physical process of drawing: the relationship between the hand, the drawing material and paper. In his practice, the rhythm of his drawing matches that of his breathing. In recent drawings, Bullen lays thin paper onto uneven surfaces, found or made. He is aware

that to draw a straight line is not possible because of the resistance and disruption of the ground on which the paper is placed. Consequently, the physicality of the drawn mark, and occasional rupture of the paper, becomes a record of the moment of its making. For Bullen, the creative value of experience, of dwelling and of slowing down the making process are key.

Bullen's theory and practice of drawing is part of a sharpening focus on the role and value of drawing within the new Creative Futures. Specifically, it informs the drawing research project *Touching the World Lightly*, on which Bullen works with Jane Fox and Dr Philippa Lyon. This study asks: how can we understand the pivotal value of touch and collaborative processes within two artists' drawing practice? It aims to articulate the generative nature of practice-based research by developing a collaborative methodology involving dialogue between the embodied, manual practices of drawing and writing.

# The world of creative exchange

Connective journeys through arts practice



Research practice in fine art is bringing deeper understanding of human communication and interaction. Alice Fox, an expert in inclusive arts practice, has been pursuing this enquiry in a number of projects, with artist-formulated events across the world from the streets of Kathmandu to the new buildings at Tate Modern. The methods she employs with fellow artists are helping to form a vital understanding of how, for example, conversational exchange through art might be a benefit to vulnerable people or those for whom communication has been difficult or impossible.

The principal of communicative exchange is a complex one and is evident in all our daily lives. What does a meeting take from us and what do we give? What is the visible and invisible result of exchange? Through what methods can we heighten our understanding of what for many is a sub-conscious act?

Alice Fox is an Educational Fellow at the new Tate Exchange, a space for everyone to collaborate, test ideas and discover new perspectives on life, through art. This has enabled her to increase the influence of her enquiry, while developing the global outreach of the scheme.

She presented her piece *Frozen Unfrozen* at the Tate's Give and Take opening event in 2016. In this work, two performers gradually come closer together from opposite ends of a three-metre strip of cloth sprinkled with ash. The process takes almost ten minutes and, during this time, the performers stretch to pass back and forth a block of frozen Thames Water.

Their body heat and the friction of handling melts the ice through the process of exchange, and with this connection and intimacy visibly increase. As they journey slowly towards each other, the Thames water goes from its frozen stasis back to fluidity, with water droplets



and ashy footprints mapping the details of the exchange. The performers finally hold the ice together face-to-face as it melts away between their lightly touching fingers. Through the expanded practices of 'listening', facilitated by the changing materiality of the ice, the performers enter into an intense 'being with', a shared understanding of each other's fragility and strengths.

The principles of creative exchange are also at the heart of Fox's work in Kathmandu. For her *Guff Gaff Taxi* project (*guff gaff* is Nepali for 'exchange' or 'conversation'), Alice Fox invited artists and thinkers to join conversational taxi journeys, with a focus on exploring the dynamics of exchange. The context of this journey of exchange was the city itself and the artists' relationship to it, recognising roads as the arteries of the city, sometimes flowing, other times blocked, smooth in parts and pitted and muddy in others. The taxi travels either in harmony or discord with the pace of lives unfolding in the flanking streets and buildings, while passenger artists collaborate in a series of drawings charting their journey.

Here again there is an intense experience of 'being with'. *Guff Gaff Taxi* builds on the idea that walking and talking together are traditionally productive of communication. Participants are not facing each other but facing forward, while doodling helps process the problem solving. The pressure of making a 'good drawing' is taken away in favour of an exchange of ideas to which the materiality of pen and paper lends itself as a

tool. Marking the journey through the monsoon roads, coordinates and times and dates are stamped on the paper, while the taxi driver also makes a signature and, despite a lower caste status, is part of the conversations, bringing a radical intervention to the caste system.

Through her work, Fox has new understanding of the material support for communicative practice, the patient rituals that can be developed or transgressed. She asks whether the artistic exchanges she has developed through making time for a journey, were richer than a 'round the table' conversation. Indeed, the framework of exchange is itself a journey – whether round Kathmandu, across a strip of ash-sprinkled paper, or, in another project, pushing a block of ice around the Nepali capital. In these experiments there is a greater immediate collegiality, squashing up in the smaller style old-fashioned taxi, for example, which leads to a communicative generosity.

Alice Fox will support the Nepali artists to become international partners with the Tate Exchange, a further stage of an exploration of 'exchange' as a key theme for the gallery. Her work aims to understand how performative acts can deepen inquiry into how all human beings, collaborate, journey together and exchange.



# The potential of touch

Textile design and the prevention and treatment of scabies

An age-old but now increasingly common skin condition is the focus of an interdisciplinary project between Brighton and Sussex Medical School and design researcher Vikki Haffenden. The research explores scabies, a complaint which flourished during the era of medieval pilgrimages when travellers occupied communal dormitories. The parasite *Sarcoptes scabiei* which is responsible, burrows into the skin laying eggs which hatch and cause itching which can be severe.

Scabies is more common in the twenty-first century within care homes for the elderly where close contact between residents and staff is the norm. Jackie Cassell, Jo Middleton and Stefania Lanza at BSMS are researching the diagnosis, treatment and management of scabies outbreaks focusing on care homes in Kent, Surrey and Sussex but with wider implications for the whole of the UK.

As with headlice, scabies is not contracted due to a lack of cleanliness but is directly related to people occupying a relatively confined, communal space. As the stigma around headlice in children has receded in recent years, now this research, the first for 50 years, aims to do the same for an older generation around scabies.

Scabies can spread easily and can go unnoticed until symptoms develop after about four weeks. Diagnosis is problematic in the elderly as it can be difficult to spot and can be misdiagnosed as a pre-existing dry skin condition. For treatment to be effective it has to be implemented simultaneously to all those affected. So, if there are 30 or more residents and staff in a care home, all have to have a lotion applied from head to toe, which is kept on for up to 12 hours before being washed off. This is costly, labour intensive and distressing, especially for residents with dementia who don't understand why they are being treated. The organisation of treatment can be bureaucratic as high street pharmacies rarely stock sufficiently large quantities of the treatment. There is also a cost implication with care home staff possibly having to pay prescription costs to treat their families and close contacts.

To raise awareness of the condition, an exhibition *Sanctuary? Scabies and other afflictions along life's pilgrimage* was recently held at Eastbridge Hospital, Canterbury. The medieval venue was a stop on the ancient pilgrimage route drawing a parallel to elderly people cared for in care homes at the end of their life's journey. In order to give visitors the sensation of what it is like to suffer from scabies, knitted textile designer and researcher Vikki Haffenden worked with Jackie Cassell and Stefania Lanza to design an experiential garment – something that was easily tried on and which mimicked the appearance and physical sensation of having scabies. Haffenden said: "Obviously people couldn't remove their clothing at the exhibition but we wanted them to experience how it feels on their arms and neck. The shape of the garment draws on historical liturgical garments – in particular the amice which was worn by priests and monks over the shoulders. Its shape hints at the potential of healing through human touch, and also the potential of touch to transmit infection.

With her expertise in knitted textiles design, Haffenden explored a range of different styles and materials to create an end product consisting of one arm which is irritating and uncomfortable to wear but didn't appear infected, and the other, which is representative of sores and scabs that subsequently form, realistically represented using dye, beads and sequins. As well as being able to try on the garment, visitors to the exhibition were able to see videos of people's experiences, including a woman who describes the trauma of getting scabies when she was just three years old, a care home manager who describes her experiences of managing an outbreak and a doctor who describes her difficulty in diagnosing and declaring an outbreak.

With residential care of the elderly continuing to grow, this is an important area of research. Plans are now in place to run workshops and develop educational materials for care home staff in order to raise awareness of scabies and reduce the stigma of this condition.



# Assistive technologies for stroke sufferers

The life-changing effects of a stroke often result in patients requiring the use of assistive technologies in either the short or long-term, which can enable them to improve their quality of life and safely perform tasks that they would otherwise find difficult or impossible.

Associate Professor Anne Mandy has developed an adaptation to standard manual wheelchairs which converts them to power-assisted machines. The Neater Uni-wheelchair (NUW) was designed through a collaboration with clinical stroke experts, Neater Solutions, and wheelchair users and was funded by the Department of Health.

Mandy's research indicates that, compared to market competitors, the NUW is now not only more efficient, but the preferred method of movement by wheelchair users. This is because it is particularly intuitive to use in a home environment when moving across floor mats and around bends.

It enables the body of the user to retain a more symmetrical position during propulsion, producing less stress on the back and buttocks which results in the lowest levels of muscle activity in the shoulders and biceps during propulsion.

The technology is currently being developed in collaboration with Univali University in Brazil following a British Academy Newton Mobility Award to develop assistive technology in Brazil. Mandy's work has stimulated discussions and a potential collaboration with two local wheelchair manufacturers: Jumper and SMART. These companies are interested in undertaking the production in Brazil, a country with access only to very limited assistive technology. The manufacture of the wheelchair kits in Brazil has the dual benefit of providing opportunities for local business development whilst facilitating access to the assistive technology locally without concerns for import restrictions.

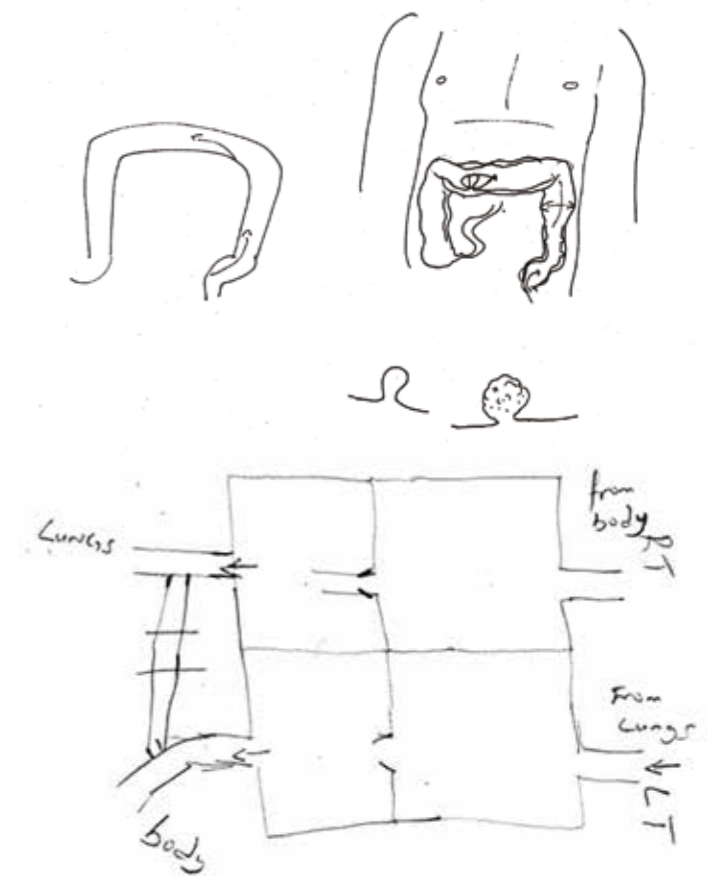
The technology is set to improve the everyday lives of many who are affected by strokes, providing them with an important means of increasing mobility and independent living.

## The picture of health

### Drawing in the clinical consultation

Have you ever had a consultation with a health professional in which they reach for pen and paper and draw you a diagram? The chances are that you have, as many health professionals – surgeons, nurses, physiotherapists, GPs – make sketches, drawings or diagrams to help explain and communicate to patients. It might be to give a clear explanation of a diagnosis or prognosis, or it might be to help a patient understand and prepare for a procedure. Given the academic literature tells us how crucial good communication is to patient outcomes, it is perhaps surprising that there is almost no formal research examining the function and impact of these 'clinical drawing' practices.

Research being carried out by Dr Phillipa Lyon and Martha Turland addresses this gap in the understanding. The focus is only partly on what such drawings or diagrams look like as objects or records, although many hand-made drawings are retained on medical records and by patients. The researchers argue that the core significance of clinical drawing relates to the way it is carried out as part of a live social interaction. In this context, the making of a drawing is part of a holistic experience in which speech, gaze, gesture and annotations all play a part. The drawing process appears to have a guiding effect for health professionals, helping them establish a clear explanation that is pitched appropriately for the patient. It also supports patients in focussing on the explanation given and its relevance to their bodies and their own circumstances.



Lyon and Turland have interviewed health practitioners from a range of specialisms at Brighton and Sussex University Hospital Trust as part of their investigations into these practices. A first article from this study has just been published in *Visual Methodologies Journal*, with a further article underway. A new phase of the work, based on a simulation model, is currently being set up with paediatric surgeon Ruth Hallows.

Top image: Drawings made by Daniel Hansen, Neurology Research Nurse, as part of a research interview in 2015. These drawings are of the type he would have made in a previous role on an Endoscopy Unit.

Bottom image: Drawing of the heart, of the type made for parents of neonatal babies, drawn by pediatrician as part of a research interview, 2015.

# Join the dance

## Dance and sport for health, happiness and well-being

We know that taking part in physical activities such as sport and dance can bring well-being benefits, such as being more satisfied with life and feeling happier and less anxious and depressed. However most of the evidence that has been collected about the connection between a sense of well-being and sport-based or dance-based activity is about adults. Little research has been carried out among young people to investigate the relationship between subjective well-being (what individuals report about themselves and about the things that affect their well-being) and taking part in sport and dance.

An Economic and Social Research Council programme has looked to fill this gap with a systematic review focusing on 15-24 year-olds produced by the Culture, Sport and Wellbeing research network comprising the University of Brighton, Brunel University London the London School of Economics and the University of Winchester.

Professor Alan Tomlinson, Brighton's lead in the research network, sees it as an opportunity to collate data which supports widely recognised assumptions about the benefits of sport and dance for young people: "The data may not be extensive, and the review identifies just eight peer-reviewed studies which have rigorously addressed the issue of subjective well-being and its relation to sport and dance. But this did cover 977 participants from six countries. The findings are more than merely suggestive, as they are based in randomized control trials, and covered a range of activities – yoga, dance-training, hip-hop dance and ice-skating for instance."

The systematic review has, more generally, established that a great deal of published research touches on the

benefits of participation in sport and dance, but often tends towards the descriptive rather than analytical accounts. More analytical evidence signposts some important directions for future research and practice. Firstly, young people taking part in sport or physical activity report being in better health, and consequently they also report higher life satisfaction. Secondly, healthy and unhealthy young people report feeling happier and having a greater sense of purpose when they spend their time doing sport or physical activity, as compared to when they spend their time in other activities. Both of these findings are reported by other members of the research network, Professor Paul Dolan and Stefano Testoni of the London School of Economics, in a forthcoming paper. Thirdly, some types of physical activity, including yoga and Baduanjin Qigong have the potential to improve subjective well-being, while group-based and peer-supported sport and dance may promote feelings of subjective well-being by combating anxiety, depression and anger.

Overall, the strongest evidence available in the review suggests that yoga-type activities are the most effective for wellbeing and that group-based and peer-supported sport and dance programmes may promote wellbeing in youth groups such as these. The evidence provides promising findings upon which sport and dance programmes could be more widely developed, and, perhaps most importantly supported and sustained. The review examined studies from the last ten years and identified a relative lack of good-quality evidence, particularly in the UK; so, much remains to be done to recognise and further realise the full potential of dance and sport for the well-being of young people.



The University of Brighton works year-round with regional, national and international partners to capitalise on its dedicated research environment and its multi-disciplinary enterprise and engagement activity.

Explore further our themed research under the Brighton Futures initiative: Radical Futures, Connected Futures, Responsible Futures, Healthy Futures and Creative Futures:

[www.brighton.ac.uk/research/](http://www.brighton.ac.uk/research/)  
[ResearchOffice@brighton.ac.uk](mailto:ResearchOffice@brighton.ac.uk)

Contact us to see how your organisation can engage with our specialist staff and resources:

[www.brighton.ac.uk/research-and-enterprise/index.aspx](http://www.brighton.ac.uk/research-and-enterprise/index.aspx)  
[KnowledgeExchange@brighton.ac.uk](mailto:KnowledgeExchange@brighton.ac.uk)

Discover our postgraduate research study options:

[www.brighton.ac.uk/research-and-enterprise/postgraduate-research-degrees/index.aspx](http://www.brighton.ac.uk/research-and-enterprise/postgraduate-research-degrees/index.aspx)  
[DoctoralCollege@brighton.ac.uk](mailto:DoctoralCollege@brighton.ac.uk)

**RADICAL  
FUTURES**

**CONNECTED  
FUTURES**

**RESPONSIBLE  
FUTURES**

**HEALTHY  
FUTURES**

**CREATIVE  
FUTURES**



**University of Brighton**